



FRIDAY, AUGUST 28, 1896.

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Contributions.

Accident Record—Correction.

An officer of the Chesapeake & Ohio calls our attention to the erroneous statement, in our issue of Aug. 21 that a collision had occurred on that road at Bardwell, Ky. This was due to an error in making up, and the collision should not have been charged against the Chesapeake & Ohio, nor indeed against any other road. It occurred on a gravel-pit track, was not so disastrous as the newspaper accounts would indicate and, being on a track of that character, should not be included in our record in any event. A correct statement of the facts reached us before the article was printed, but, as before stated, the order to "kill" the matter in type was not carried out.

Mr. Bryan and Railroad Rates.

August 21, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

That editorial on "A Presidential Candidate and Railroad Rates" is a terrific blow. But one other statement by Mr. Bryan was more clearly dishonest: The debtor may choose with what kind of stuff he will pay his debts; and private contracts in regard to pay shall be void! I agree to pay you horses, but that is void and I choose to pay you jackasses. It used to take two to make a bargain, but that is old fashioned. This is a campaign of honesty—but a few millions are expected to shut their eyes and show their "moral dullness." The mass of men believe what they want to, and then search for argument; but your editorial is a "stunner."—PROFESSOR.

Jubilee of the London & North Western Railway.

LONDON, Aug. 14.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In connection with my article on this subject in your issue of July 17 I may add that the annual mileage there given of 42 millions is that run on the London & North Western metals alone, the company's engines running some 20 million miles more over about 950 miles of other companies' lines.

The broad-gage tank engines of the Bristol & Eastern Railway, which were very few in number when that line amalgamated with the Great Western in 1876, were shortly afterward rebuilt as tender engines, 8-ft. driving wheels and a rigid trailing axle being substituted for the 9-ft. wheels and trailing bogie of the original type. The "Cornwall" has thus had the largest driving wheels in the world for nearly 20 years. Its weight is officially given as 28 tons 6 cwt. in working order.

W. B. PALEY.

The Remonetization of Iron.

NEW YORK, Aug. 25.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have been reading with some interest the letter of Mr. Andrew Marcellus in the *Railroad Gazette* of Aug. 21, concerning the silver coinage question. While his arguments in favor of free-silver coinage are not new he has put them in a little more terse and vigorous style than we usually see them.

There is one point that Mr. Marcellus makes which suggests a proposition that has been made before, and which I offer for his serious consideration.

Mr. Marcellus says that under free and unlimited coinage silver can not sell for less than \$1.29 per ounce because the U. S. mint will take the silver and coin it into legal tender at \$1.29 per ounce. If this is true how much better it would be to use instead of silver some metal

which we can obtain still more plentifully—say a good quality of No. 1 foundry pig-iron. The silver men claim that we want more money in circulation, and surely under a free pig-iron coinage the quantity could be much greater than with silver. If the Government, as Mr. Marcellus points out in the case of silver, says that pig iron is worth \$1.29 per ounce and pays that amount for it, no one is going to sell it for less. What a magnificent prospect opens up here for the iron industry!

Undoubtedly the silver-mine owners will object to pig-iron coinage, but the iron industry is much larger and employs a greater number of men and is therefore entitled to greater consideration. As they say in the patent specifications I do not limit myself to pig iron for coinage, but any of the products may be used as open hearth, crucible steel, nickel steel or any other of the numerous forms of this useful metal. Thus all branches of the iron industry would be stimulated, and as this always affects other industries the prosperity of the country would exceed the most sanguine predictions of the most enthusiastic silver man.

I feel assured that if Mr. Marcellus will only consider this matter carefully, and apply his own arguments in favor of silver to the free coinage of pig iron he will see the tremendous superiority of the latter as a circulating medium, and will at once form a party with pig iron as its platform.

JOHN R. SLACK.

Storage Batteries for a Street Railroad.

Englewood & Chicago Electric Street Railway Co.,
NEW YORK, Aug. 24, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Permit me to correct one statement made in your description of the Englewood & Chicago Electric Street Railroad otherwise correct. You say, "The storage batteries which are to supply the power are of the same type as were used on the Madison Avenue Line, New York, a few years ago, but were discarded."

The type of battery to be used on the Englewood Road is an entirely different one from the old Julien type, which was used on the Madison Avenue Line some years ago. It is exactly the same type as has been in use on the Madison Avenue Line since November last. These batteries are now being shipped to Chicago, and will be put in service as part of the Englewood equipment in addition to the equipment mentioned in your statement. It may be of interest to the electrical world that after ten months constant use, never missing a trip, these batteries are today as good as new. They have never cost one cent for repairs or renewals of any kind since they were installed.

ISAAC L. RICE.

Killing Weeds in Texas.

Gulf, Colorado & Santa Fe Railway Company,
CLEBURNE, TEX., July 22, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have received your letter relative to killing weeds and grass on right of way. Several years ago an attempt was made to kill weeds and grass on the roadbed from Galveston northward for several miles by using common seawater from the bay, which was applied by a sprinkler carried on a car. I understand the grass was thoroughly saturated, but the method did not prove a success. It killed only a portion of the vegetation; weeds and grass soon sprung up again, and the experiment was abandoned. The only resort then was to cut them with shovels.

I presume the circumstances on our Gulf coast are much the same as those spoken of in Guatemala, except that we have less rain. To keep our track in anything like a respectable condition it is necessary to cut weeds and grass from four to six times a year. In fact, we have but about two months in a year that weeds do not grow very rank. This is on account of the moisture and the heat.

I have been using for the last year a liquid which, after numerous experiments, I can say will now kill everything of the nature of weeds or grass to which it is applied.

We have in this portion of the United States what is called "Johnson grass," which I have never seen anywhere outside of Mississippi, Louisiana and Texas. When I tell you that its roots are as large as a man's finger, and that they go to the depth of 15 ft. if they do not find water before you can judge what we have to encounter. Generally in the black lands and the coast lands of Texas the roots run from one to three feet into the ground, and grow as thick as they can lie. This grass, I understand, was originally brought from Venezuela and planted in the Southern districts. It was believed at the time of its importation that it would be a great thing for grazing lands, as it could never be killed and would produce from two to six tons an acre of fine hay for stock. After Texas became more thickly settled and the people commenced to cultivate the ground, the feeding of Johnson grass hay to animals caused the land to become seeded with Johnson grass, from the excrement of cattle, and in other ways, and instead of the grass being a benefit to the country it became a curse; and the rights of way of all railroads in this state are covered by this grass.

It has become a serious financial question how we shall keep this grass down, so that we can run trains over the tracks without delay, as engines slip on the grass on grades. This grass grows as high as six feet, and in two weeks after it has been cut clean to the surface of the ground it will be nearly ready to head again.

From the above you can see why I have been compelled

to study the problem of killing grass. I have had charge of 1,200 miles of roadbed in this state for this company for several years. I recently applied the solution, referred to on a piece of roadbed $\frac{3}{4}$ of a mile long, where grass was just as thick as it could grow, and, strange as it may seem, the solution has killed every root or shoot of the grass, and I do not look for anything to grow on this piece of roadbed for at least another year. The liquid is poisonous, and kills everything that it strikes.

The question of an electric killer has been explained, I think, in the *Railroad Gazette*. The matter of a grass burner we have under consideration, and have a machine that we are using with the best of results, although we are not yet ready to put it on the market.

We have brought the cost of grass and weed cutting down from \$50 per mile to less than \$10 per mile per year, which you can see is quite a saving for the Maintenance of Way Department.

F. W. BISBEE,

Superintendent of Track, Bridges and Buildings.

The Limits of Compressed-Air Motors.

WORCESTER, Mass., Aug. 21, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Many thanks for the proof of "Investor's" letter [*Railroad Gazette*, Aug. 21]. All I can say is to corroborate him in general. Practically all data on compressed-air cars come from Europe, where conditions are much easier than here. I should like to see the very figures he asks for. He is committing injustice, however, in computing the equipment cost per car alone of the two systems. Almost any self-propelled car costs more to equip. But a trolley road uses up enough in extra central station and permanent way cost to more than overbalance the compressed-air system.

He is right in that elasticity to meet a tremendously variable load and to exert a sharp pull in starting are the requirements which throw out the compressed-air motor. But the faculty which the cable possesses of meeting them easily is not enough to cause its retention in spite of its other disadvantages, could anything else be found to handle the traffic.

In the *Electrical Review* (London: 22 Paternoster Row, New York: D. Van Nostrand) for July 10, 1896, commences a series of articles on "Fraction Diagrams," which are worth reading.

S. A. R.

UTICA, N. Y., Aug. 25, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have read with considerable interest the communication on the subject of the limits of the compressed air motors which appeared in last week's issue of the *Railroad Gazette*. Some time ago I had the opportunity to carefully examine the Hardie compressed air motor at Rome, N. Y., and was impressed with some of the very features that your correspondent, "The Investor," believes to be lacking in the motors that are in use to-day. As the Hardie motor was thoroughly described and fully illustrated in your journal of May 29th of this year, it will be quite unnecessary to go into details.

Your correspondent states that "the pace for street-car speed and acceleration has been definitely set by the cable and the electric motor." In the compressed air motor referred to, by means of a simple wrist movement of the motorman, an extra pressure of about 60 lbs. per square inch acts against the piston to propel the car, and the motor has shown its ability in Rome and in New York to get as good "a hump on it" as the cable or electric car. This is not theory but actual fact. Besides this, the air-motor cars are under more perfect control of the motorman than the cars operated by either of the other systems.

In order to answer the question raised in regard to the useful space occupied, it will only be necessary to refer him to Figs. 2 and 3, page 370 of the *Railroad Gazette*. He will see that no useful space is taken up with the mechanism, and I might add that the car there described has demonstrated its capacity to carry a heavy load and pull a trailer at the same time.

It is doubtless true, as he states, that the compressed air-motor is much heavier than one equipped with an electric motor, but he is also aware that the extra weight of the former is not such an objectionable feature as many suppose. In the common forms of electric motors now in use the mechanism is fastened rigidly to the car axle and the rails are pounded, an effect that engineers have long sought by some means to get rid of. In the car equipped with the compressed air mechanism the driving parts are all supported on a frame resting on independent springs. This saves both the track and the nerves of the passengers.

Let me also remind "The Investor" that what may be cheap in one place may be very costly in another. He could not contract to build an electric road down town in New York City for any price, and what New York is looking for is not the cheapest, but the best. It is, as yet, too early to determine the exact cost of running a road by means of compressed air, but we question if it will exceed that of the cable or electricity. These few points in regard to the Hardie motor are worth consideration, and, like your correspondent, I desire to know more in regard to the practical features of this system, which can be determined only after many months of actual service.

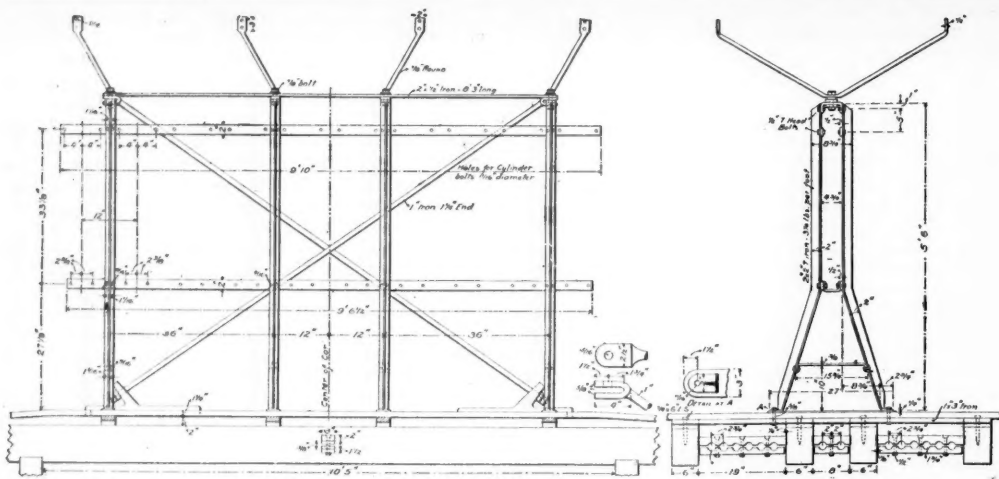
ANDREW J. WALKER.

A Suggestion for an Improvement in Train Schedules.

MONADNOCK, N. H., Aug. 22, 1896.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In your issue of Aug. 14 appears one of Mr. Acworth's letters on current topics in England. No doubt most of



Side Elevation.—Fig. 4.

End Elevation.—Fig. 5.

Cylinder Support—Wabash Instruction Car.

your readers enjoyed it, but I doubt if any read, with the same interest that I did, this paragraph:

"The last few years has seen an enormous improvement in the convenience of the services between London and Scotland. Up to three years ago a passenger, unless indeed he chose to start from London with the newspapers at 5:15, or with the mail at 7:15 in the morning—times both of them much too early for English habits—practically had the choice between starting at 10 in the morning or else between 8 and 10 in the evening. In 1893, afternoon expresses leaving about 2 and reaching Glasgow and Edinburgh (roughly 400 miles) about 10:30 were introduced, and they are the most popular and the most crowded trains in the service. Last year there were put on night trains at 11:30 and 11:50 by the two lines, respectively, so that passengers could spend the

evening at a theater in London and yet reach their destination in time for breakfast next morning. This summer there is a yet further development. Scotch expresses leave Euston and King's Cross at 11:20 and 11:30 respectively for the accommodation more especially of passengers who have to travel up to the London termini from outlying districts, the time of arrival in Glasgow and Edinburgh being, roughly, 8 o'clock."

Some two and a half years ago I had the pleasure of reading a paper to the Commercial Club of St. Louis on the passenger schedules then existing at that city. I found that from that large city of upward of half a million there was practically no train arriving or departing except in the early morning or early evening. I endeavored to show that these were really not the most convenient hours for St. Louisians, and that what they wanted were afternoon and late evening trains to Kansas City, New York and Chicago, at least one daily to each, allowing the majority of trains to remain as they were, to suit the travel passing through the city.

Afternoon trains and late night trains have universally been the most popular trains wherever instituted, as between Boston and New York, Washington and New York; and Mr. Acworth now adds corroborative testimony from England where the distance is 400 miles, and the time as long as would be required between St. Louis and Chicago or Kansas City.

In the St. Louis territory considerable progress has been made; whether my efforts have helped I shall not undertake to say. There is a noon train for New York on the "Big 4" and another at 1 p. m. on the Pennsylvania Lines. There is no question about these trains being the most popular today on their respective lines. The Pennsylvania has one arriving at three in the after-

noon and the B. & O. one arriving at 12:30. From Kansas City the Missouri Pacific has one leaving Kansas City at 1:30, arriving at 10, but no opposite train. I understand this train does a good business, and has from the beginning. There are after-theater trains, so called, to Chicago and Kansas City, and these are well patronized. Many were disappointed that the Illinois Central, since it has now a more direct line between St. Louis and Chicago, did not inaugurate an afternoon service.

It really seems very difficult to convince the average railroad manager who works at his desk till five or six in the evening that anybody wants to take a train leaving at two, three or four in the afternoon, but they do. People are not as willing to spend a night on a sleeper as formerly. If they must go to another city on business, they want, if possible, to get a good rest in a comfortable bed. When the General Manager travels in his own car, he has far more quiet and comfort than the ordinary passenger, who may, however, be traveling on quite as important business and need all the comfort obtainable. Once upon a time a very big man on a very big road was traveling in his car. A friend in the train called on him, and as they neared the station for the evening meal rose to leave, but was bidden to remain and have supper in the car. "O, no," he said, "I want you to have supper with me." So the very big man did, and thereafter that day was important in the annals of the place, for those that had known it knew it no more.

In addition to the new service above mentioned from St. Louis there have been several morning mail trains instituted, leaving between 2:30 and 3:00, which are building up the commercial importance of St. Louis materially, but which of course have little value as offering additional passenger service directly. Most passengers can as well leave the evening before as in the early morning.

I am firmly of the opinion that between cities where the run can be made in eight hours or less, afternoon trains will universally furnish the service most desired by the traveling public, and I also feel that a considerable number of people will travel oftener when such a service is given than they would without it. Nothing could more strongly indicate that such is the case than the instance cited by Mr. Acworth.

GEO. B. LEIGHTON.

Instruction Car of the Wabash Railroad.

An instruction car equipped with the various appliances used and operated by engine and trainmen is one of the many new features of the Motive Power Department of the Wabash Railroad. Mr. J. B. Barnes, Superintendent of Motive Power and Machinery, has devoted much time to the design and inside arrangement of this car, in which work he has been assisted by Mr. M. R. Coutant, Chief Draftsman and Air-Brake Instructor.

Over a year ago Mr. Barnes became convinced that a great saving could be made by properly instructing the employees of the road as to the construction and operation of the air brake, steam heat and other complicated mechanism used daily by his men. So sure was he that there was a great need for such instruction that he proposed building a car and equipping it with all the necessary appliances. He assured the officers of the company that such a car would pay for itself within six months by reducing the amount of material destroyed through ignorance and carelessness. As afterward proved, the car paid for itself within three months instead of six.

We are now enabled to illustrate the Instruction Car, with detail drawings of some of the special features. The car was built and equipped at the company's shops at Moberly, Mo., in 1895, and measures 50 ft. between end sills. From the outside the appearance presented is that of an ordinary passenger coach, with the exception of the sliding door near the front end. The accompanying engravings give a general idea of the inside arrangement. Fig. 1 shows a longitudinal section, Fig. 2 the plan and Fig. 3 a cross-section of the car. Upon entering the car from the front end, the first thing which is noticed is the vertical engine and dynamo in the left-hand corner. These are mounted on the same base, the dynamo being directly connected to the engine shaft. By means of a clutch in the shaft the engine can be disconnected from the dynamo and run alone. The engine in question was built by the Westinghouse Manufacturing Company and develops 5 H. P. when running under normal conditions, namely 500 revolutions per minute and 80 lbs. steam pressure. A steam pressure of 125 lbs. is carried on the boiler and a Mason reduction valve is introduced in the delivery pipe, so that the pressure in the steam chest is always constant regardless of fluctuations of the boiler pressure, thus insuring the constant performance of the engine. The dynamo is a 50-volt machine built by the Westinghouse Electric & Manufacturing Company and supplies current for twenty-five 16-C. P. lamps, used for lighting the car.

Across the car and opposite to the engine is a coal box 42 in. long by 36 in. wide and 48 in. high. This box has a capacity of 2,000 lbs. of anthracite coal, which is enough under ordinary conditions to supply the boiler for one week.

The boiler, as shown in Figs. 2 and 3, is in the center of the car, conveniently situated with reference to the coal box and engine, so that the fireman can have everything within easy reach. This boiler was built by the Westinghouse Manufacturing Company, and is of the vertical

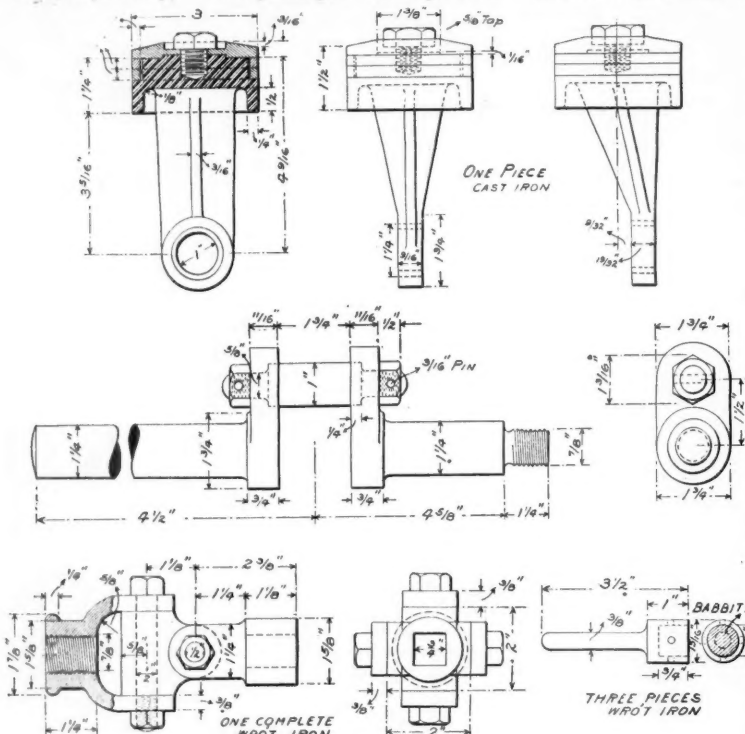
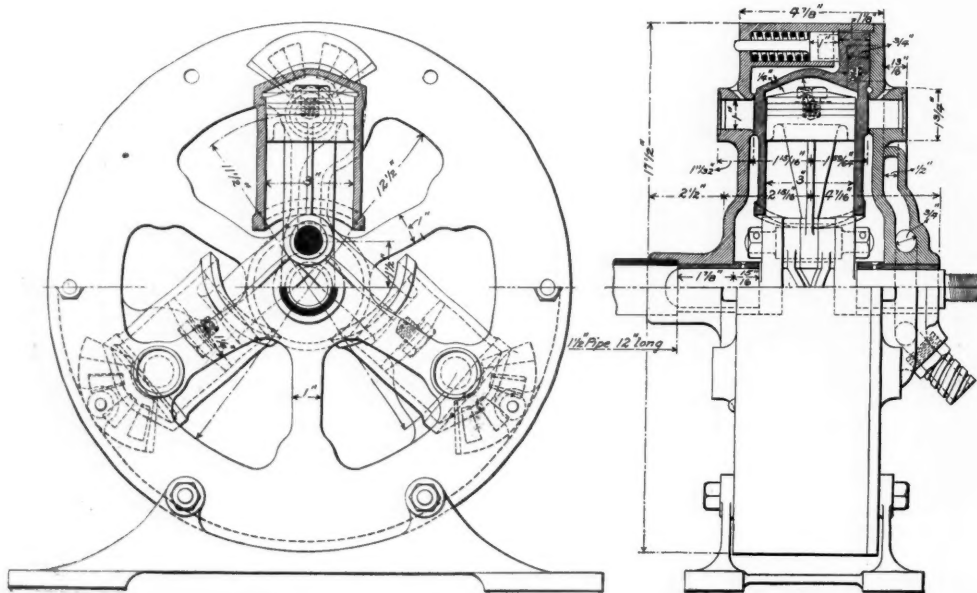


Fig. 10.—Details of Oscillating Engine.



Elevation.

Section.

Fig. 9.—Oscillating Engine.

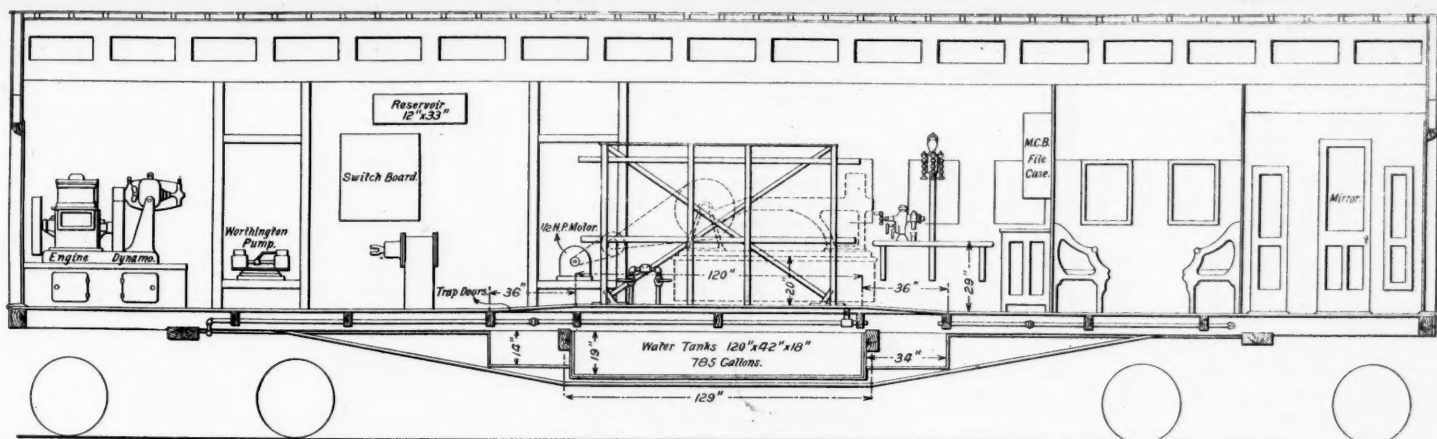


Fig. 1—LONGITUDINAL SECTION.

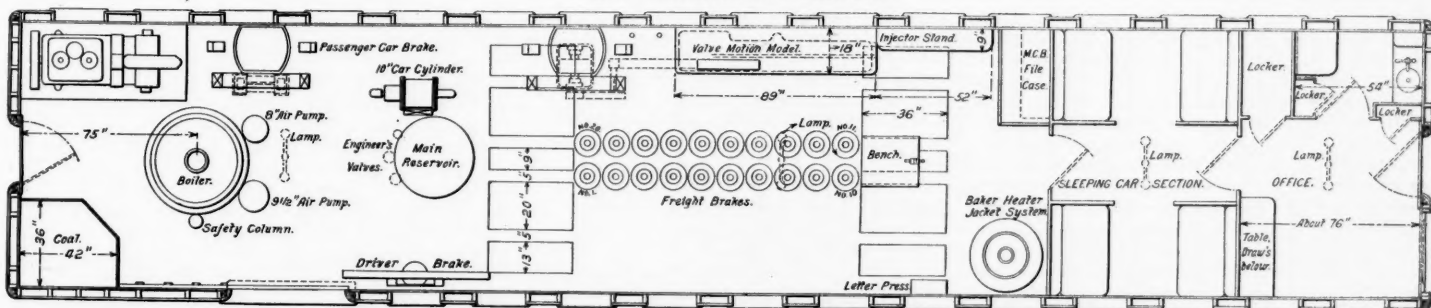


Fig. 2—PLAN.

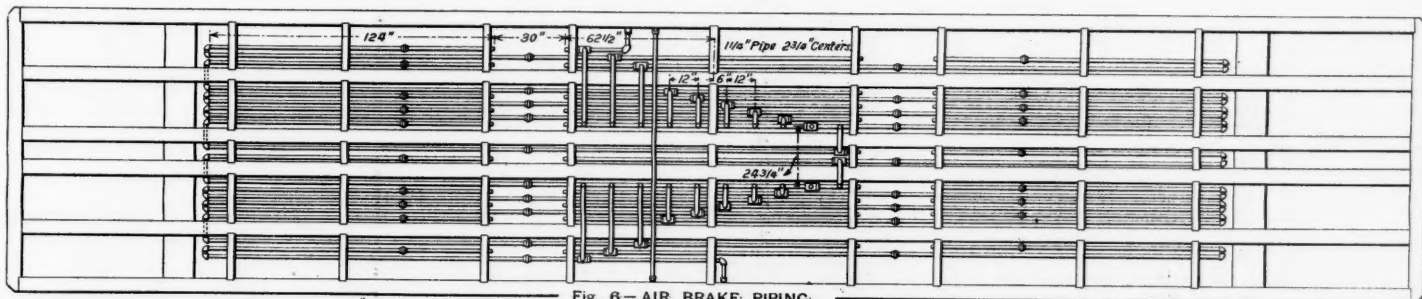


Fig. 6—AIR BRAKE PIPING.

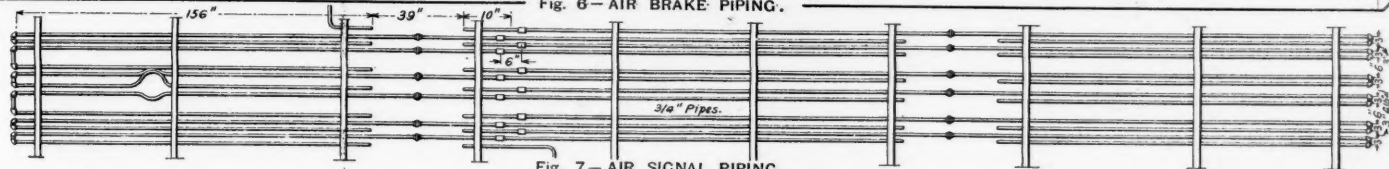


Fig. 7—AIR SIGNAL PIPING.

INSTRUCTION CAR OF THE WABASH RAILROAD.

From Design of Mr. J. B. BARNES Superintendent of Motive Power.

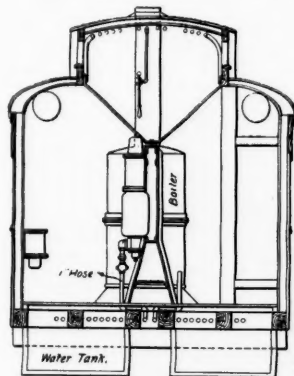


Fig. 3.—CROSS SECTION.

type with water spaces on the sides and horizontal water tubes. The boiler fittings and furnishings are very handsome and complete. In addition to the usual water gages and glasses, this boiler has a cast-iron water column, made by the Reliance Gage Company, and so designed that in case of either high or low water a whistle is blown notifying the fireman. The water can be fed to the boiler either by means of a No. 1 Ohio injector or a No. 2 Worthington pump. Two tanks under the car floor carry the water supply, and are shown in Figs. 1 and 3. These tanks are each 120 in. long, 42 in. wide and 18 in. high and together have a capacity of 785 gallons. The boiler is usually fed by the pump, the injector being used to pass steam into the tanks under the car and so heat the feed water. A hose can be attached to the feed pipe leading to the boiler, the boiler connection being closed by a valve, and the pump worked if it should be necessary to extinguish a fire. At the back of the boiler and supplied by it with steam, are two Westinghouse air-pumps, one a 9 1/2-in. and the other an 8-in. pump. Three Nathan lubricators are used, one for each pump and one for the engine. Beyond the boiler, and in the center of the car is the main auxiliary reservoir, placed vertically. On the sides of the reservoir are mounted four styles of engineer's valves, namely the old three-way cock, the B-11, D-8 and D-5. Each of these engineer's valves can be cut in so as to operate the brakes. Mounted on the top of the reservoir are four duplex gages, one connected to each valve, showing the train line and reservoir pressure. Also on top of the reservoir there is a D-5 engineer's valve in section. To the right of the main reservoir and swung from the wall is an 8-in. air-pump in section. This is so suspended that it can be seen from all sides. On the same stand is the head of a 9 1/2-in. air-pump in section. Directly beneath these is a valuable piece of apparatus, consisting of a push-down driver brake, complete, with all brake rigging, brakeshoes and wheels. This can be operated

at will from any of the engineer's valves and shows the action of the various parts during an application.

On the left side of the car, opposite the driver brake, is a similarly complete rigging as used on passenger cars, the cylinders, brake rods, beams, shoes and wheels being full sized. These can be operated similarly to the driver brake. This rigging is placed in a vertical position so that it does not occupy much space. Above the passenger brake and attached to the wall are a sectional freight brake cylinder, and quick-action freight triple valve. Next to the driver brake, on the right wall of the car, is the air-brake rigging as applied to a tender. With this the plain triple valve is used. The stem of the working triple valve is connected to a similar sectional triple valve directly below it, so that when the tender brake is being used the sectional triple valve shows the position of all the various parts.

As shown in Figs. 1, 2 and 3 there is a rack in the center of the car supporting 20 air-brake cylinders. This

arrangement corresponds to a 20-car train. To save space, these cylinders are placed vertically, the piping being under the floor of the car. The pipes are of the same length as used on freight cars. The details of the rack are shown in Figs. 4 and 5. It will be seen that this rack while very light is also strong and well braced, and answers the purpose so well that when a heavy application of the brakes is made there is no jar whatever. The arrangement of the piping for the brake rack is shown in Fig. 6. With the pipes under the floor much space is gained above, while the connections can be reached through trap doors in the floor. The connections are all made by angle cocks and hose the same as with cars in service. By this means any number of cylinders can be used, corresponding to different sized trains. Either the passenger or driver brake can be cut in with the rack, so that it will either be on the first or last car in the train, or all brakes can be used at the same time. Duplex pressure gages are attached to the cylinder and res-

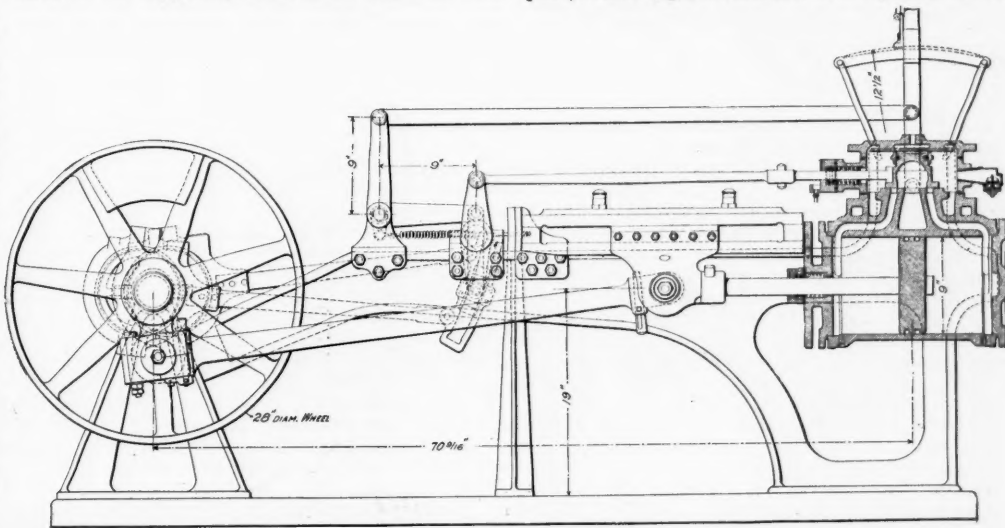


Fig. 8.—Valve Motion Model.

ervoir of the first and twentieth brake of the rack, and also to the cylinder and reservoir of the passenger and driver brake, showing the variations in pressure during an application. It will be noticed that it has been the constant aim to reproduce the conditions found in service, and at the same time to place each piece of apparatus so that its workings can be studied from all points.

As shown in Fig. 3, the signal pipes are placed in the roof of the car, a plan of the piping being given in Fig. 7. These pipes are connected by angle cocks and hose couplings and represent 13 50-ft. coaches. Either one all, or any number can be cut in and used at one time. The reducing valve working the signal is placed on the side of the main reservoir, while the signal valve is on the right wall. A reducing valve and signal valve in section are placed near the working valves.

Cords are suspended from the roof near the middle of the car, correspondingly attached to each coach, so that by this means the air signal can be operated from any point in the test train. To the right of the brake-cylinder rack is a half-sized model of the working parts, on one side, of the Wabash class "F" locomotive. The class "F" locomotive is the one now used in passenger service and is of the 8-wheel type with cylinders 18 in. x 24 in. An elevation of the model is shown in Fig. 8 and consists of the first driver, connecting rod, crosshead, guides, eccentrics, links and reverse levers complete, while the steam chest, cylinder, valve and piston are sectioned. The sectioned parts are covered with glass to keep out dust. This piece of apparatus has been made, even to the smallest detail, exactly like the class "F" engine, and for engineers and firemen is one of the most valuable features in the instruction car. A belt connects the valve model with a small oscillating air engine, so that the model can be run at any desired speed and the effect of changes in the position of the reverse lever and the action of the various parts can be clearly illustrated. No doubt the fact that the parts are proportioned and finished exactly as on the road engines makes this model of much greater value than if it consisted of a mere skeleton giving the same motion to the valve.

Another very interesting model shows three pairs of drivers connected to the locomotive frame, with air, brake rigging, brakeshoes, etc., complete. All parts are in the same proportion, and when the air is applied the brakes go on as in actual service. This model is used to show the action of the pull-back brake and was furnished by the American Brake Company. The model is also driven from the small oscillating air engine.

The oscillating air engine was designed and built by Mr. J. B. Barnes especially for the instruction car and embraces many new features. Figs. 9 and 10 show the elevation, section and detail drawings. The frame work of this air engine consists of two castings, bolted together and forming a casing. The three 3-in. cylinders are cast with lugs on the sides, which fit into the casing so as to allow the cylinders to oscillate. The pistons, which are shown in Fig. 10, work side by side on the crank shaft. A valve seat is finished on one of the casings, and is raised $\frac{1}{8}$ in. above the surface of the casing proper, a similar raised surface being on the cylinder. The surfaces are held in contact by means of a coil spring. The air connection is made near the axle and air is conducted by means of a cored passage in the casing to the face of the valve. There are two openings in the face of the casing, one leading to the air supply and the other to the atmosphere. Two similar openings in the cylinder casting (Fig. 9) lead to the cylinder. As the cylinders oscillate they alternately take in and exhaust air through these passages. As three cylinders are used there are no dead points, the engine being able to start from any position.

On a stand beyond the valve-model are mounted full-sized sectional models of the Ohio, No. 7 and No. 8 Monitor and No. 7 Friedman injectors. Also, a sectioned triple-sight feed Nathan lubricator, these being the standards used on the Wabash road. The car is supplied with full sets of gages for the various parts of the air-pump and other brake apparatus, wheels, axles, etc., so that instruction can be given in the use of gages. There is also a full-sized locomotive Barnes balanced valve, arranged so that it can be easily taken apart and examined. A Baker heater, which can be used either with direct steam or the jacket system, is placed on the car. Trainmen receive instructions as to the proper methods of operating the steam-heat equipment.

All the electrical apparatus is controlled from a switch-board shown in Fig. 1. This switchboard is supplied with a Weston ammeter and volt meter and a cut-out switch for cutting the dynamo in and out of circuit. In case of short circuit there is an automatic safety switch. The voltage is regulated by a rheostat, and is kept at 50 volts. As will be seen from Figs. 1 and 2, the rear portion of the car is sectioned off into two compartments, one fitted up with four berths, on the plan of a sleeping-car. In the daytime this is used for an examining and instructing room. The rear compartment is used for an office for the Air-Brake Instructor and is supplied with all necessary furniture. These two compartments are very handsomely furnished and all the appointments are complete. As the Air-Brake Instructor is required to spend most of his time in the car, it is fitted up with everything necessary to his comfort. Gages in the office of the car connect with the signal air-brake, train line and auxiliary reservoir, so that when the car is going over the road the Instructor can see just how the engineer handles the air-brakes. There is also a Boyer speed recorder on the car, with a gage in the office, so that the speed of the train can be known.

The car is moved from one division to another until all the employees, whose duties require them to be familiar

with the air-brake, and other appliances have been instructed. After a time these men are examined and graded on their examinations. If it is seen that a man does not understand any part of the apparatus, he is further instructed until he is able to pass a satisfactory examination. In this way the men are soon familiar with the construction and theory of the mechanism with which they are working. Engineers and firemen are also instructed as to the proper handling of locomotives, and are required to pass an examination covering the same.

The car is also used by Mr. G. C. Kinsman, Superintendent of Telegraph; Mr. C. B. Adams, Superintendent of Car Service, and Mr. M. R. Coutant, Air-Brake Instructor, who comprise the Color Test Committee for examining men who have been rejected by the company's surgeons. These men are given practical color tests, for which the car is supplied with all necessary apparatus.

The Chicago Drainage Canal.

As mentioned in the *Railroad Gazette* of Aug. 14, the Western Society of Engineers with their friends made an excursion on Aug. 15 down the Chicago Drainage Canal. The party numbered 380. The train consisted of eight coaches and a baggage car and was furnished by the Atchison, Topeka & Santa Fe.

At Lockport two hours were spent inspecting the work on section 15 and the controlling works. From this point, which is the end of the canal proper, the party returned toward Chicago, the next stop being at Romeo, at which place the work is completed. Another stop was made at Lamont, where the railroad crosses the canal. At Columbia Park luncheon was served by the Entertainment Committee of the society in the grove adjoining the railroad station.

After luncheon the train proceeded to Willow Springs, where an hour was spent inspecting the work on sections A and I. At this point the rock and earthwork come together, section A being glacial drift, while section I is in solid rock. At McCook the train was switched back over the tracks of the Calumet Terminal, and the methods of removing the earth at this point were noted. The last stop was made on section H, where a very interesting machine designed by Messrs. Hoover & Mason is being used. The train arrived at Chicago on the return at 5:25 p. m.

A brief statement of the present condition of this work may be interesting to our readers.

The district has already issued \$12,800,000 of bonds, all payable in currency, \$8,000,000 being 5 per cent. bonds and \$4,800,000 being $4\frac{1}{2}$ per cent. bonds, running from one year to 20 years; one-twentieth of the issue must be paid off and retired each year, and \$950,000 has already been retired, leaving \$11,850,000 now outstanding. These bonds have been sold at an average premium of about $1\frac{1}{2}$ per cent. The taxes afford a revenue sufficient to pay off and retire one-twentieth of the issue each year, and leave a surplus to apply upon the current obligations of the district incurred for construction.

The canal is now under contract from its confluence with the South Branch of the Chicago River, at Robey street, in the city of Chicago, to Lockport, its southern terminus, in Will County, Ill. At the south end of the channel the controlling works are located. Beyond these works the construction contemplated by the district will be the work necessary for conducting the flow from the channel in conjunction with the waters of the Desplaines River down the declivity to and through the city of Joliet, and making such changes in the Illinois and Michigan Canal as the new conditions will make necessary.

The first work put under contract extended southwesterly from the Willow Springs road, and these sections are numbered consecutively Nos. 1 to 14; average length of sections, 1 mile. Easterly from Willow Springs road, the sections are lettered from A to O, omitting J. The lettered sections are, except for a short distance near Summit, entirely in glacial drift.

The sections from 1 to 14 were put under contract July, 1892; from A to F were put under contract late in 1892 and early in 1893; and G to M were contracted for in December, 1893. Sections N and O were put under contract May 2, and section 15, August 27, 1894.

The Desplaines Valley is traversed by the river from which it takes its name—a stream of wide fluctuations with no constant and reliable fountain supply. During some seasons of the year its whole discharge would pass through a 6-inch pipe, and at others its volume reaches 800,000 cubic feet per minute, flooding the whole valley. Such being the situation, control of this stream was a condition precedent to the successful prosecution of the work upon the main channel. This control has been secured by an outlay of nearly \$1,100,000 in constructing what is known as the "River Diversion Channel." About 13 miles of the new river channel had to be excavated, and about 19 miles of levee built. The width of the River Diversion Channel on the bottom is 200 feet, side slopes $1\frac{1}{2}$ to 1, grade generally 12-100 per 1,000 feet.

At the head of this River Diversion it was necessary to provide a spillway, to allow surplus water to flow toward Chicago, as arrangements have not yet been perfected for carrying the entire flood waters of the Desplaines through Joliet. This spillway is a concrete dam capped with cut stone and its wings faced with stone masonry; it is 397 ft. long and its crest is 16.25 ft. above Chicago datum (this datum is referred to the low water of Lake Michigan of 1847 and is 579.61 ft. above sea level at Sandy Hook). No water flows over this spillway until the

volume passing the water gage above it reaches 300,000 cu. ft. per minute.

Sections 7 to 14 inclusive are in solid rock; width at bottom 160 ft., sides vertical, prism taken out in three stopes with offsets of 6 in. on each side for each cut, making top width 162 ft.; grade in rock 1 ft. in 20,000 (.05 per 1,000). Section 15 is also in rock, and its cross-section is enlarged at its south end so as to form a "windage basin" in which large vessels may be turned around. The controlling works are on this section. These works will consist of gates or movable dams by which the flow of water from the main drainage channel into the tail race, which is to deliver the outflow into the Desplaines River, can be controlled.

The fluctuations in Lake Michigan, by varying slope of water surface, will be felt at the controlling works, and provisions must be made to meet these fluctuations within a range of 5 ft. above datum and 8 ft. below, or an extreme oscillation of 13 ft. The fall from datum at the controlling works to the level of the upper basin will be about 42 ft. in a distance of about $4\frac{1}{2}$ miles.

The contract for these controlling works (executed January 18, 1896) covers the construction of seven sluice gates of metal, with the necessary masonry bulkheads and one bear-trap dam. The sluice gates may be considered as a modification of what is known as the Stoney gate type, gates having a vertical play of 20 ft., and opening of 30 ft. each. The bear-trap dam has an opening of 160 ft. and an oscillation of 17 ft. vertically. This dam is essentially two metal leaves hinged together and working between masonry bulkheads. The down-stream leaf is securely hinged to a very heavy foundation and the up-stream leaf is so placed as to present the barrier to the water. This structure is operated by admitting water through properly constructed conduits, controlled by valves, beneath the leaves just described.

To raise the crest of the dam, water is admitted from the up-stream side and the discharge shut off until the desired height is obtained and then the valves are adjusted so that the volume of water beneath the leaves shall be constant. To lower the crest the water beneath the leaves is drawn off until the desired height is reached, when the valves are again arranged so as to maintain a constant volume of water.

The total amount of excavation involved in the construction of the main channel is 26,261,815 cu. yds. of glacial drift and 12,006,934 cu. yds. of solid rock, or an aggregate of 38,268,749 cu. yds., to which must be added the material excavated from the River Diversion: glacial drift, 1,806,074 cu. yds.; solid rock, 258,669 cu. yds.; total River Diversion, 2,064,743; grand total River Diversion and main channel, 40,333,542 cu. yds. All of this work is now under contract and in addition thereto 384,958 cu. yds. retaining wall. The rock when broken up expands about 80 per cent. and therefore the volume of the rock spoil banks will be nearly 22,078,000 cu. yds. The whole volume of spoil (earth and rock), if deposited in Lake Michigan in 40 ft. of water, would make an island one mile square with its surface 8 ft. above the water line.

The largest amount of material excavated in any one month since the work began was in August, 1894—1,201,688 cu. yds. of glacial drift, and 413,164 cu. yds. of solid rock; but the largest estimate returned was for the month of June, 1895, amounting to \$742,365, representing the excavation of 959,074 cu. yds. of glacial drift, 555,500 cu. yds. of solid rock and 13,799 cu. yds. of masonry laid in cement.

During the month of July, 1894, 74,800 cu. yds. of solid rock were removed by the contractors for Sec. 8, a record which, up to that time, had probably never been equaled. Since that time, however, this feat has been eclipsed by the contractors for Sec. 14, who, during the month of April, 1895, excavated 86,400 cu. yds. of solid rock.

There has been expended by the district to May 1, 1896

For right-of-way.....	\$2,483,244.07
For construction.....	13,543,473.08
Making a total of.....	\$16,026,717.15
This amount together with the cost of administration, payment of bonds, interest, etc., brings the total expenditures of the district to May 1, 1896, to about \$21,936,000.	
The estimated cost of all the work under contract is as follows:	
Construction account.....	\$19,242,827.67
Right-of-way account.....	2,606,227.92
Total.....	\$21,849,055.59

On the earth sections some novelties have been introduced. On section L and M cars, especially constructed, are loaded by steam shovels and drawn by steam hoists up a steep incline to a proper height, where they run on tipples and are automatically dumped. Each incline is equipped with two four-yard cars which load and dump alternately. On sections I and K the contractors have erected bridges spanning the spoil bank at proper height, their supporting piers being carried on trucks which travel on tracks parallel with the channel. From the channel end of the bridge an inclined track runs down into the cut. In connection with this device two eight-yard cars are used, which are successively loaded by steam shovel, drawn up the incline on to the bridge by steam hoist, and then automatically dumped and immediately returned to the pit. An output of 100 yards per hour can probably be sustained by this combination of devices.

On Section H a conveying machine designed by Messrs. Hoover & Mason has been constructed on a mammoth scale. It is essentially a bridge spanning the channel with cantilever arms projecting far enough

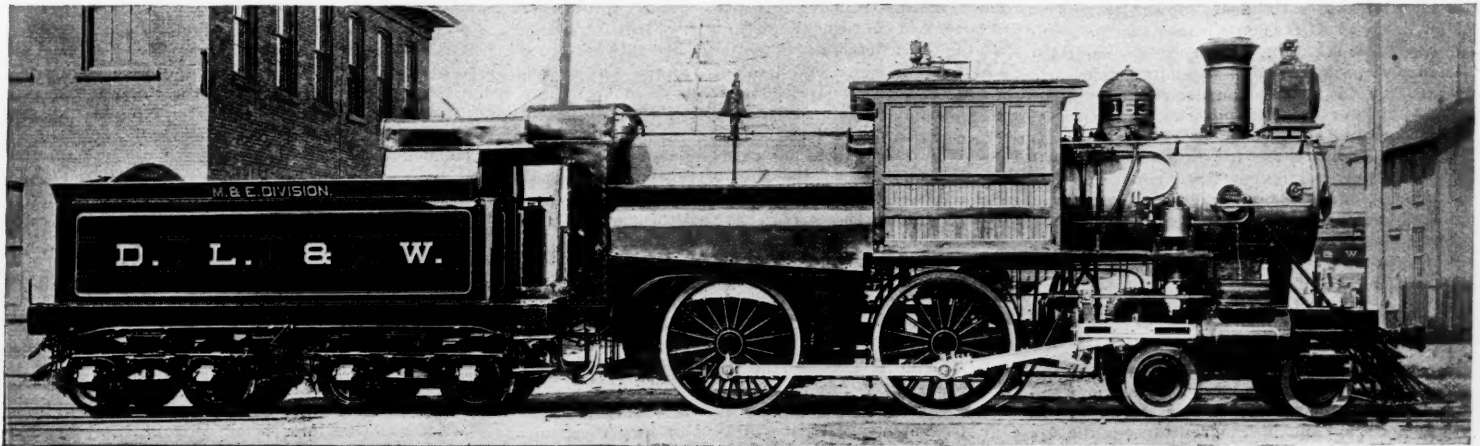
beyond on each side to overhang the spoil area. On this structure are mounted the necessary sprocket wheels and other machinery for carrying a series of steel pans which form the conveyor belt. The structure is 640 ft. from end to end and it is mounted on trucks traveling upon tracks parallel with the channel. Its estimated capacity is 500 cu. yds. per hour. On Section F the material is taken from the steam shovel by cars fitted with pneumatic dumping apparatus, the power for which is supplied from the locomotive. The engineer operates these dumps just as he would apply the air brakes. Sections A, B and C are in the old channel of the Des-plaines, and are overlaid with muck to a considerable depth. This muck is being removed by hydraulic dredges. Each of these dredges now in use has a capacity of about 2,500 cu. yds. in 10 hours and this output in solid matter represents about 8 per cent. of the capacity of the pumps. One great advantage of the hydraulic method of removal is that the material can be removed to any desired dumping ground within a distance of 3,000 ft. without adding anything to the contract price of excavation.

On those sections which are partly in earth and partly in rock, all of the usual methods of removing earth are in use, varied to suit peculiar conditions, or to meet the ideas of contractors doing the work. On Section 6 a large amount of muck has to be removed, and a very ingenious contractor has improvised a hydraulic dredge at a very small cost, and is doing excellent work at very moderate expense.

On the rock sections, the sides are cut down vertically by channelling machines, and the merits of the several makes can be well demonstrated on this work. Of course steam drills are used, and on some sections these are worked from a central power station by compressed air. The top lifts have been removed by the use of carts and tram cars, the traction for which latter is usually

trains between Hoboken and Washington, N. J. They are intended to burn the smaller (buckwheat) size of anthracite. The specifications were drawn up by Mr. David Brown, Master Mechanic of the D. L. & W. The engraving shows one of the new locomotives, No. 163, and the following table gives a description and the general dimensions of all the new engines:

Description.	
Type.....	Eight-wheel passenger
Name or number.....	91, 163, 164
Name of builder.....	Dickson Mfg. Co.
Name of operating road.....	Baltimore & Ohio
Gage.....	4 ft. 3 1/2 in.
Simple or compound.....	Simple
Kind of fuel to be used.....	Culm
Weight on drivers.....	79,500 lbs.
" truck wheels.....	37,500 lbs.
" total.....	117,000 lbs.
General Dimensions.	
Wheel base, total, of engine.....	22 ft. 11 1/4 in.
" " driving.....	8 ft. 6 in.
" " total (engine and tender).....	49 ft. 1 in.
Length over all, total, engine and tender.....	59 ft. 3 in.
Height, center of boiler above rails.....	8 ft. 6 in.
" of stack.....	15 ft. 1 in.
Heating surface, firebox.....	175.22 sq. ft.
" " tubes.....	1,430.90 sq. ft.
" " water grates.....	14.72 sq. ft.
" " total.....	1,719.84 sq. ft.
Grate area.....	80 sq. ft.
Wheels and Journals.	
Drivers, number.....	4
" diameter.....	68 in.
" material of centers.....	Cast steel
Truck wheels, diameter.....	33 in.
Journals, driving axle, size.....	11 in.
" truck.....	10 in.
Cylinders.	
Cylinders, diameter.....	19 1/4 in.
Piston, stroke.....	24 in.
" rod, diameter.....	3 1/2 in.
Kind of piston-rod packing.....	Jerome's meta
Steam ports, length.....	17 1/4 in.
" width.....	1 1/4 in.
Exhaust ports, length.....	17 1/4 in.
" width.....	3 in.
Bridge thickness.....	1 1/4 in.



Culm-Burning Express Locomotive for the Delaware, Lackawanna & Western Railroad.

Mr. DAVID BROWN, Master Mechanic.

Build by the DICKSON MANUFACTURING CO., Scranton, Pa.

supplied by steam hoisting engines. The lower lifts are taken out by the use of cableways, high-power derricks and cantilever conveyors.

The cable-ways as first constructed were not very successful, but experience gained upon this work resulted in improvements from time to time, and now they have been brought to an efficiency which makes them worthy competitors of the cantilever conveyors. The high-power derricks used on two of the sections have not come up to the expectations of the builders, and their use will probably be confined to the machines already in place. The revolving derricks on Section 14, after a great deal of costly experimentation, have developed considerable merit, and will probably drop into the rank of reliable and desirable appliances. The cantilevers are probably the most perfect devices now known for hoisting and disposing of material from rock cuttings such as these. There are now eleven of these cantilevers working upon four sections. The average daily output of rock for the month of June, 1895, reached 21,365 cu. yds., requiring the use of eight tons of dynamite.

The original contracts for this work called for its completion April 30, 1896; on that date Sections 8, 9, 10, 11, 12, 13 and 14 were practically done, also Sections, I, K, L and M. Extensions of time have been given on many of the unfinished sections to Dec. 1 of this year, by which date it is probable that all the main channel excavation will be completed except N and O, on which sections work has been delayed pending adjustment with the railroad companies whose rights of way have to be crossed.

Up to May 1, 1896, 21,654,064 cu. yds. of glacial drift and 11,112,191 cu. yds. of solid rock had been excavated, a total of 32,766,255 cu. yds., or 81.2 per cent. of the entire excavation, also 111,539 cu. yds. of masonry laid in cement. The total value of this work amounts to \$15,544,812.20.

New Locomotives for the Delaware, Lackawanna & Western.

The Dickson Manufacturing Company, of Scranton, Pa., has recently completed three culm-burning passenger locomotives for use on the Morris & Essex Division of the Delaware, Lackawanna & Western road. These engines are designed to haul the heavy express

Valves.	
Valves, kind of.....	Allen-Richardson balanced
" greatest travel.....	5 3/4 in.
" outside lap.....	1 in.
" inside lap.....	0 in.
" lead in full gear.....	1/8 in.
Boilers.	
Boiler, type of.....	Wooten
" working steam pressure.....	160 lbs.
" material in barrel.....	Carnegie steel plate
" thickness of material in barrel.....	1/2 in. and 3/4 in.
" diameter of barrel inside at tube sheet.....	56 in.
Seams, kind of horizontal.....	Double riveted
" circumferential.....	Double riveted
Thickness of tube sheets.....	3/8 in.
" crown sheet.....	3/8 in.
Crown sheet stayed with radial screw stays.....	1 in. diam.
Dome, diameter.....	28 in.
Tubes.	
Tubes, number.....	220
" material.....	Wrought iron
" outside diameter.....	2 in.
" length over sheets.....	12 ft. 6 in.
Firebox.	
Firebox, length.....	10 ft.
" width.....	8 ft.
" depth front.....	48 1/2 in.
" back.....	39 1/2 in.
" material.....	Carnegie steel plate
" thickness of sheets, side, 1/2 in.; end, 3/4 in.; crown, 3/8 in.	
Grate, kind of.....	Wrought-iron water tubed
Stack.....	Straight
" inside diameter.....	18 in.

The Artistic Element in Engineering.*

... The very nature of an engineer's qualifications, his technical knowledge, the cultivation of his judicial and critical faculty, his training in fidelity to the trusts reposed in him by private clients, all these fit him for places of large responsibility concerned with public works, and the people, tired of political management, are beginning to find this out. ... With an engineering practice based solely on immediate results by way of expected profits in dollars and cents, the aesthetic element has little to do, though even here its absence may mean financial loss. But from the standpoint of this paper engineering is to be considered in the broader light of Tredgold's well-known definition: "The art of directing the great sources of power in Nature for the

*A few extracts from a paper by Prof. F. O. Marvin, Vice-President Am. Association for the Advancement of Science, Section B; read at the Buffalo meeting.

use and convenience of man," while the engineer is he who designs and executes engineering works. ... With an engineering practice based on a generous interpretation of the above the artistic has much to do. ...

In a certain sense every engineer is an artist, and in some directions at least, as in architecture and other forms of construction and in the making of public parks, the result of his cultured brain may attain to the dignity of a work of "fine art." Perhaps, in its true essence, there may be as much fine art in the design of a machine to produce bolts as there is in the making of a picture. Certainly the well-planned tool, with fine proportions and parts perfectly related, is above the poor canvas.

To every true man there is a joy in creation that is not satisfied with anything less than the best of which he is capable. As Emerson said, "I look on that man as happy, who, when there is question of success, looks into his work for a reply, not into the market, not into opinion, not into patronage." What is vulgar, and the essence of all vulgarity, but the avarice of reward? "Tis the difference of artisan and artist, of talent and genius, of sinner and saint." But beyond this, which is the purely personal side of the matter, lies service, the designing for the use and convenience of man. From the vantage ground of his position as a man of educated intelligence and trained ability, the engineer owes the world his best effort.

These are the three elements of design, scientific, æsthetic, and the financial. ... Artistic treatment often costs money, yet the mere expenditure of cash will not secure it. On the other hand, the proper display of good taste may often come without the spending of a dollar more than is made necessary by the other conditions surrounding the problem. A wealth of ornamentation may be vulgar, while beauty and grace may be

found in the simple lines of a machine or bridge or in the curving of the curb by the roadside. ... The current engineering practice gives great attention to the first and last of these elements and but little, comparatively, to the second. There is no branch of it but would be benefited by adding to scientific and business ability a knowledge of the principles of artistic design and an impulse to give expression to it. The effect on the life of our communities and the nation by such a change is not easily estimated. ... Our railroads are contributing toward this change. They have found the decoration of passenger trains a profitable thing and, so stimulated, have carried it to excess. Handsome terminal stations, adorned in good taste, are supplanting the dingy, forbidding and inconvenient places so long in use, while the shed type of depot is being crowded out by beautiful, quaint buildings set in the midst of lawns and flower beds. More significant still is the tendency to adopt a high standard of maintenance, under which the roadbed is kept trim and neat, flanked by sodded slopes and bordered by clean and well-kept buildings, and which also requires the rolling stock, the shops and yards to be maintained in a high state of efficiency. This is not necessarily in itself artistic, but it furnishes at least a necessary foundation. That the railroad management understands to some degree the commercial value of the artistic element in its business is further evidenced by the nature of its advertising, that seizes on any advantage of scenery or artificial effect that is at hand. ...

As a designer of so much that the world needs for daily use the engineer must do more than keep up, he must keep in advance. He must not only have a capacity to enjoy, but also the power to originate and apply. To this end he must give preliminary study and thought to the principles of æsthetic design, so gaining an intellectual knowledge of them. American engineering schools are doing little or nothing to help the young engineer to this. So far as the writer knows there is but one American textbook, Professor Johnson's book on bridges, that includes any discussion of the matter. A course of study in engineering æsthetics near the close of college life would be a great help and stimulus to a young graduate, at least opening his eyes to the fact that there is such a thing.

Why an Electric Motor Revolves.*

BY D. L. BARNES.

The action of the current in producing rotation in an electric motor is quite simple. While many electrical problems are comparatively complicated, the principal elements in the operation of electric railway apparatus may be readily understood.

The fundamental fact is the relation between an electric current and a magnet. If a piece of iron be surrounded by a coil through which current is passed, it becomes a magnet. In Fig. 1 the passage of a current through the coil of wire around the iron bar in either direction renders the iron a magnet, with all the well-known properties of a magnet. It will attract iron, and the space surrounding it becomes magnetic. Iron filings will arrange themselves in the direction shown by the dotted lines in the figure. One end of the magnet is a north pole and the other a south pole.

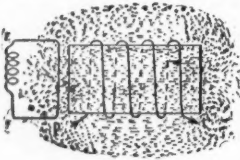


Fig. 1.

If a wire, such as *CD*, be moved past either pole of the magnet, there will be a tendency for current to flow in the wire either from *C* to *D* or from *D* to *C*, according to the character of the pole past which it is moved and to the direction of the movement. If the ends of the wire *CD* are joined by a conductor, so that there is a complete circuit, a current of electricity will flow through the circuit. This circuit may be either a simple wire, as shown by the line *CEFD*, or it may be the windings on machines enabling the current to produce mechanical work, or it may be electric lamps producing light. The essential feature is that there shall be a complete path from *C* to *D* for the current to flow, no matter how complicated the circuit may be.

The reason why there is a tendency for an electric current to flow in the wire *CD* when it is moved in the vicinity of a magnet is not known. There are several theories, all more or less involved and depending upon pure assumptions as to the nature of an electric current. For all practical purposes it matters not what the reason is, the fact that current flows when there is an electric pressure in a closed circuit, is the important thing, and it serves all useful purposes to know that current does flow and that its direction and amount are always the same under similar circumstances. There are many facts in mechanics that are accepted and used practically, about which little is known as to the fundamental and primary causes and this fact about motors and dynamos is, therefore, only one of many, which all must accept without a full and complete explanation.

The intensity of the electric pressure, or electromotive force, depends upon the velocity of revolution of the wires and upon the strength of the magnets, and the quantity of current depends upon the electro-motive force and upon the amount of the resistance in the circuit. Other things being equal, the current through a long small wire, or greater resistance, will be less than through a short thick one, or a less resistance.

Having seen that when a wire is moved in the vicinity of a magnet an electric pressure is produced which will cause a current to flow in a closed circuit, one can easily conceive of many ways in which a current of electricity may be generated by combining magnets and wires so that there will be a relative motion between them. In order to make a continuous flow, the relative motion must be continuous; and if the current is to be uniform the motion must be uniform.

Two electro-magnets are shown in Fig. 2 in which the north pole of one magnet is near the south pole of the other, and the magnetic field between the two lies in approximately straight lines between the two magnets, as indicated by the dotted lines. If the wire *CD* be moved across this field and its ends be joined, as by the dotted circuit *CEFD*, a current will flow in this circuit. The wire *CD* may be made to revolve around the wire *EF*, passing in front of one pole and then in front of the other pole, as in Fig. 3. The current in the circuit will pass in one direction when the wire is passing one pole and in the other direction when it is passing the other pole. The connection between this elementary arrangement and the dynamo is easily recognized. In the dynamo a magnetic field is produced by the electro-magnets, called "field poles," and a considerable number of wires, similar to the wire *CD*, are placed upon an armature so that they revolve in front of the poles. Each individual wire produces current first in one direction and then in another direction, as explained above; but if there be many wires there will always be the same number in front of the north or positive pole and the same number in front of the south or negative pole, so that the total or resultant action is practically uniform and may be made to produce a continuous current. Such a machine is the common dynamo or motor.



Fig. 3.

A dynamo transforms mechanical into electrical energy, and a motor transforms electrical into mechanical energy. The two operations are reversible and may be effected in the same machine; a dynamo may be used as a motor or a motor may become a dynamo. A machine is a motor when it is driven by a current of electricity, and it is a dynamo when it is driven by mechanical power and produces an electric current. If a motor be driven by an engine, it can deliver a current of electricity which is able to operate other motors or electrical apparatus or lights. A simple form of electric machine is shown in Fig. 4, which is the general form of the electric motor. In this there are two projections of steel, *H* and *G*, which are made electro-magnets by the current going through the wires wound around them from any source of electricity, such as a battery at *I* and *J*. These magnets have poles facing toward a drum, *K*, revolving on a shaft. The poles *G* and *H* are called the "salient" poles: the poles *M* and *P* are called the "consequent" poles. The magnetic flow or field is shown by the dotted lines. On the periphery of the drum are arranged wires in the slots shown. As this drum is revolved, there will be a tendency for electricity to flow in the wires. In order to get a current of electricity from these wires it is necessary to make a complete circuit. As each of the wires in the slots passes in front of a pole, a pressure or electro-motive force will be generated, and its direction will depend upon whether the pole is a north or a south pole.

The pressure or electro-motive force generated in the wires moving in front of the positive or north field poles will be in one direction, while those in front of the negative or south poles will be in the opposite direction. Therefore, if two such wires be connected together at one end of the armature the free terminals of the wire at the other end of the armature will have the sum of the electro-motive forces generated in the two wires. The wires so connected can be considered as a turn of a single wire, instead of two separate wires, and this turn may be connected in series with other turns, so that the resulting electro-motive force is the sum of that in all the turns and all the wires so connected. It is customary to connect the coils of an armature so that the electro-motive force given is that obtained from half the coils in series. The other half of the coils is connected in parallel with the first half, so that the currents flowing in the two halves will unite to give a current in the external circuit equal to twice the current in the two armature circuits or paths.

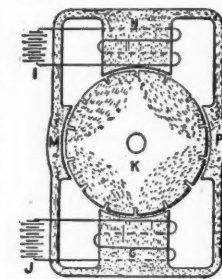


Fig. 4.

It is evident that, as the armature revolves, wires which were in front of the positive pole will pass in front of the negative pole, and that in order to maintain the electro-motive force it will be necessary to change the connections from the armature winding to the external circuit in such a way that all the wires between the two points of connection will have their electro-motive forces in the proper direction. The connection to the armature must, therefore, be made not at a definite point in the armature itself, but at a definite point with reference to the field magnets, so that all the wires between two points or contacts shall always sustain the same relation to the field magnets.

For this purpose a device known as a "commutator" is provided. The commutator is made up of a number of segments, as shown at *A*, in Fig. 5, which are connected to the armature winding. On the commutator are sliding contacts, or brushes, which bear on the segments and are joined to an external circuit, making a continuous path through which current may flow. As the commutator revolves the different segments come under the brushes, so that the relative position of the armature wires between the brushes is dependent on the position of the brushes. The armature wires which connect the brushes are those sustaining the desired definite position to the field magnets, so that the currents from the armature at all times flow properly into the external circuit, although individual armature wires carry currents first in one direction and then in the other direction, depending on the character of the pole in front of which they may be moving.

On two-pole machines there are two brush holders, each containing one or more brushes. On the four-pole machine there may be either two or four brush-holders, and on a six-pole machine, either two, four or six brush-holders. A single path of the current through the commutator and armature winding is shown by the arrows on Fig. 5. The brushes *B* and *C* are placed on the top side of the commutator to make them more accessible, and this gives a peculiar but simple armature winding. For the sake of simplicity, the batteries *I* and *J*, of Fig. 4, are not used on common forms of generators or motors, but the current that flows from the armature through the commutator is made to flow through the electro-magnets either in whole or in part. If all of the armature current flows around the electro-magnets or fields of the machine, it is a "series" machine; if only a

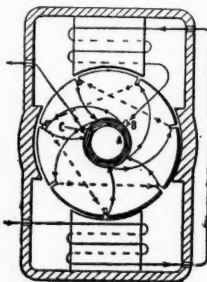


Fig. 5.

part of the current is used in this way, it is a "shunt" machine; that is, some of the current is "shunted" through the fields. Sometimes both the shunt and series windings are used, and in that case the machine is called a "compound-wound" machine. Such a machine has a large wire through which the main current passes, and a fine wire through which the shunted current flows. Fig. 5 shows how the commutator and the fields are connected, and how the current flows from the wires in the armature through the commutator in a series machine.

If the current delivered by a dynamo does not flow in the desired direction, it can be reversed by shifting the wires in the binding posts or by throwing a switch. If the motor does not revolve in the desired direction, it can be made to do so by reversing the connections to the armature or field-coils; so that, without knowing which way a current of electricity is to be generated, any practical man can make a motor revolve in a proper direction by simply changing the connections.

It is natural that a machine which gives out electric energy when driven by an external power, will, when electric energy is delivered to it, reverse its action and give out mechanical power and do work. This is not a logical reason why a motor revolves under the influence of an electric current, but it is a natural inference which assists in comprehending the fact.

Perhaps the simplest way to explain the cause of the movement of an electric motor, when supplied with a current, is to compare the action to the well-known attraction of unlike poles or magnets and the repulsion of like poles. Unlike poles are north and south; like poles are two north or two south. In any motor the current through the field causes a north or south pole to be maintained, and the current through the armature and brushes causes an opposite polarity. These constantly maintained unlike poles attract each other and pull the armature around on its axis.

It has been explained that if a motor be driven by a belt an electro-motive force is produced and the machine acts as a dynamo. It is also a fact that an electro-motive force is produced whether the power for driving the machine is obtained from a belt or from the electric current—that is, whether the machine be driven as a dynamo or as a motor. In a dynamo, however, the current flows out in the direction in which the electro-motive force is acting. In a motor the electro-motive force produced has a direction opposed to the direction of the flow of current. This may be illustrated by the following experiment:

Two similar machines are driven independently at 600 revolutions and give an electro-motive force of 100 volts. Similar terminals of the two machines are connected together. No current flows between the machines because the two pressures are the same and are opposed in direction. If now the belt be thrown off from one machine its speed will begin to fall. This will lower its electro-motive force below that of the other machine or dynamo, but will not change the direction of the force. There will now be a difference of pressure in favor of the machine which is driven, and it will now send a current through the other machine and run it as a motor. The speed of the motor will continue to fall until the difference in pressure, or electro-motive force, between the two machines, is just sufficient to cause the flow of enough current to keep the motor running against whatever frictional resistance and other resistance there may be. The electro-motive force generated in the motor, which is against or counter to that of the current in the circuit, is called the "counter electro-motive force."

In order to determine how fast a motor will run without doing work under any given pressure, it is not necessary to know anything about the dynamo that furnishes the pressure. The pressure alone is sufficient to determine the speed of the motor. For instance, if a motor will give a pressure of 500 volts when running free at 100 revolutions, it will always run at about 100 revolutions when not doing work on any electric circuit where the pressure is 500 volts.

This description of a motor or dynamo carries with it all of the fundamental theory of electrical generators and motors that it is necessary for a mechanic to know in order to take reasonably intelligent care of electric locomotives. Further useful knowledge must be attained by studying the different types of electric motors and dynamos. These other types all have the same fundamental theory, even when the construction is quite different. It has been the aim in devising these electric locomotives to adhere as closely as possible to a uniform type for all sizes, so that when a mechanic has once grasped the fundamental design of one size he will be familiar with the other sizes.

The Definition of the Civil Engineer.

The letter below explains itself. We print it here in the hope that it will help to stop an error. It was addressed to Prof. F. O. Marvin, of the University of Kansas.

"I have just received the manuscript of your address as Vice-President of the American Association for the Advancement of Science, Section D. I notice that in the course of that address you speak of 'the broader light of Telford's well-known definition, 'the art of directing the great sources of power in nature for the use and convenience of man.' This definition was Tredgold's and not Telford's, I believe, and as I am personally responsible for some of the recent confusion with regard

* Reprinted from the Baldwin-Westinghouse Catalogue of Electric Locomotives.

to this matter, I hasten to submit certain facts to you which may set you right and may help to check the spread of error. At this point you should read the enclosed article from the *Railroad Gazette* of Dec. 28, 1894.

[An Extract from the Article.—The best definition of civil engineering that has ever been made was written by Thomas Tredgold, in 1837. "Civil engineering is the art of directing the great sources of power in nature for the use and convenience of man." *Engineering* (London) has recently published the old document in which this definition is first laid down. The statement is that it is almost always ascribed to Thomas Telford, the founder of the Institution of Civil Engineers, owing to the juxtaposition of this sentence and his name in the charter of the Institution. It appears that Mr. Tredgold was asked by the Council of the Institution to define the objects of the Institution of Civil Engineers and to give a description of what a civil engineer is, and the following is the communication which he wrote in response:

"Civil engineering is the art of directing the great sources of power in nature for the use and convenience of man; being that practical application of the most important principles of natural philosophy which has, in a considerable degree, realized the anticipations of Bacon, and changed the aspect and state of affairs in the whole world, etc.]"

"This, you will see, makes it almost certain that Tredgold was the author of this definition. In June of 1895, when I was preparing for the press, Mr. George S. Morison's address as President of the American Society of Civil Engineers, I came upon the phrase 'Tredgold's definition incorporated in the charter of the Institution of Civil Engineers is familiar to all.' There happened to be sitting by me at the moment a man who is very well informed in the history of the profession who said 'but that was Telford's definition.' In spite of the fact that I had within three months quoted this as from Tredgold I allowed myself in a moment of indolence and weakness, to change Mr. Morison's manuscript to read Telford instead of Tredgold, intending to look the matter up later, but of course forgetting to do so. Thus the old error again received the sanction of high authority.

"I hope you will be able to correct this error before your address is embalmed in the archives of the American Association for the Advancement of Science and of the Society for the Promotion of Engineering Education."

Yours very truly,

(Signed) H. G. PROUT.

The Course of Railroad Rates.

Mr. F. B. Thurber has sent us the following copy of a letter addressed by him to Mr. Bryan, under date of August 25:

"In your Madison Square speech you said: 'Railroad rates have not been reduced to keep pace with the falling prices.' I have been chairman of a merchants' committee on railroad transportation, and a student of this question for many years, and assuming that you wish to be absolutely correct in all your statements, I submit the following facts embodied in a report adopted by the National Board of Trade at its last annual meeting, showing that rates for the transportation of freight have fallen more than the prices of most commodities. The report says:

"As an illustration of the progressive reduction in the charge for transportation, the average charge for carrying a ton of freight one mile on 13 of the most important railroads of the United States during 1865 was 3.08 cents; in 1870, 1.81 cents; in 1875, 1.36 cents; in 1880, 1.01 cents; in 1885, 0.83 cents; in 1890, 0.77 cents; in 1893, 0.76 cents. These railroads performed one-third of the entire freight transportation during 1893, and from the figures given it appears that 0.76 cent. would pay for as much transportation over their lines in 1893 as could have been obtained for 3.08 cents 28 years earlier. This reduction, amounting to three-fourths the average rate for 1865, has been exceeded in that of the lessened price of but few, even of those articles in the manufacture of which new inventions have worked the most radical changes.

"The entire transportation performed by the railroads of the United States during the twelve years ending June 30, 1894, was equivalent to moving 136,799,677,822 passengers and 807,935,382,838 tons of freight one mile. Had rates averaging as high as those of 1865 been collected upon this traffic, the railroads would have earned \$2,629,043,459 more than they actually received. The importance of the transportation interests of the country as a leader in industrial activity is not generally appreciated. It touches the business interests of the country at every point. This is illustrated by the fact that in 1893 there were about 874,000 men employed on the railroads of the United States; in 1894 this number has fallen to about 780,000; and since 1893 nearly one-fourth of the mileage of the United States has gone into the hands of receivers. The throwing out of employment of an army of 100,000 men was only a part of the difficulty. Not only were the number of those employed decreased, but the incomes of those who remained were lowered. There was a general cut of wages in all grades of the service. Five thousand general officers suffered, as well as 100,000 trackmen, 150,000 shopmen and over 500,000 other operatives. Wages were lowered directly and time was reduced, bringing about the same results indirectly. Industries depending on railroads for a demand were affected and many millions of people besides those actually discharged and their dependents found themselves less able to buy the necessities of life.

"During the year ending June 30, 1894, railroad stock, having par value of \$3,660,150,094, or 63½ per cent. of the total, received no dividend. During the three years ending Dec. 31, 1894, 9,178 miles of road, capitalized at \$494,821,000, were sold under foreclosure. From Jan. 1 to July 1, 1895, these totals were increased by 2,049 miles, capitalized at \$149,615,000 each respectively, which went into the hands of receivers and were sold under foreclosure."

"These statistics of diminishing returns to investors, financial disasters and widespread insolvency, clearly indicate that the present railroad charges are not too high, unless it is desirable to reduce all railroad corporations to the condition of uniform and hopeless bankruptcy. And whatever may be the opinions of citizens on the other questions embodied in the present political cam-

paign, nothing can be gained by disseminating erroneous views in regard to railroads. Thirty years ago your assertion would have been correct, but a progressive reduction from 3.08 cents per ton mile in 1865 to 0.76 cents per ton mile in 1893 and 0.75 in 1895, is certainly greater than the reduction in most other commodities. The logic of events has convinced me that we have no longer anything to fear from too high rates of freight, but the present danger is from unjust discriminations in transportation rates. I have been doing all in my power, in connection with the commercial bodies, to remedy this evil, and solicit your influence to this end."

Railroad Statistics of the United States.

We have received advance sheets of the introduction to "Poor's Manual" for 1896 and give below a few figures therefrom. In our issue of July 31 were published preliminary figures from the Annual Report of the Statistician of the Interstate Commerce Commission, which the reader may like to compare. It should be remembered, however, that Poor's figures are for the fiscal years of the companies reporting, and those of the commission are for the year to June 30. Therefore the two authorities do not cover precisely the same periods. The first table that we reprint is a statement showing the results of the operations of the railroads of the United States for the year 1895 compared with those for 1894.

The total number of miles of railroad in the United States at the close of 1895 was 180,955, of which 1,922 miles were constructed during the year. The mileage of lines making returns of their share capital and funded and floating debts equalled 179,821, against 178,054 for 1894, the increase being 1,767 miles. The share capital corresponding to the mileage completed at the end of 1895 equalled \$5,182,121,999 against \$5,075,629,070 in 1894, the increase equaling \$106,492,929, the rate of increase being 2.1 per cent.

The funded debts of all the lines at the close of the year aggregated \$5,640,942,567, a sum \$35,166,803 in excess of the total of 1894 (\$5,605,775,764), an increase of 0.63 per cent. The other forms of indebtedness of the several companies at the close of the year equalled \$418,505,082, against \$382,927,834 for 1894, an increase of \$35,577,258.

MAIN RESULTS OF WORKING.

	1895.	1894.	Increase or decrease.	Rate of increase or decrease.
Miles of railroad operated.....	179,162.18	176,229.11	2,933.07	1.66
Tons freight moved.....	763,799,833	674,714,747	89,085,086	11.72
Freight mileage.....	88,567,770.801	82,219,900.498	6,347,870.303	7.72
Passengers carried.....	543,974,283	583,248,007	* 39,273,724	6.73
Passenger mileage.....	12,642,202.551	13,606,531.635	* 968,329.084	7.05
Earnings from freight.....	\$743,764,451	\$700,477,409	\$43,287,042	6.18
Earnings from passenger.....	261,640,598	276,331,571	* 14,690,973	5.31
Miscellaneous earnings.....	87,714,543	91,134,533	* 3,419,990	3.75
Total gross earnings.....	1,093,119,605	1,067,943,513	25,176,092	2.39
Net earnings.....	323,196,454	317,757,399	5,439,055	1.71
Earnings per ton per mile.....	0.839 cent.	0.864 cent.	0.025 cent.	2.89

*Decrease.

The total share capital and indebtedness, exclusive of current accounts of all the roads making returns, equalled at the close of the year \$11,241,569,658, an increase in the year of \$225,261,943 over the total of 1894 (\$11,016,308,315), the rate of increase for the year being 2.04 per cent.

The cost per mile of all roads making returns, as measured by the amount of their stocks and bonded indebtedness, equalled \$60,188, against \$62,140 for 1894.

The following table shows some important particulars of the principal trunk lines. In the "Manual" this table is much more extended; we select for reprinting only a few of the figures:

SUMMARY FOR LEADING TRUNK LINES.

	1891.	1892.	1893.	1894.	1895.
Number of R. R. systems.....	65	65	64	62	50
Miles railroad owned.....	71,915	73,635	74,867	75,395	77,269
Total stock and bonds (millions).....	\$4,240	\$4,950	\$5,124	\$5,095	\$5,220
Miles railroad operated.....	106,458	109,477	112,023	110,674	110,031
Passengers carried (millions).....	423	423	442	408	387
Passenger-miles (millions).....	10,304	10,777	11,882	10,641	9,686
Freight (million tons).....	96,792	98,454	116,007	96,178	98,030
Ton miles (millions).....	444	475	473	419	458
" per mile of line.....	64,337	70,640	70,489	63,208	67,268
Passenger earnings.....	222,216,766	229,463,149	242,531,676	213,377,022	195,226,460
Freight earnings.....	582,410,076	623,045,616	615,185,210	526,613,462	560,947,418
Other earnings.....	61,947,030	61,305,290	65,449,175	67,930,467	61,437,832
Gross earnings (million dollars).....	866	913	923	807	817
Operating expenses.....	588	652	613	561	566
Net earnings.....	278	281	279	247	251
Rate per passenger-mile.....	2.147 c.	2.129 c.	2.341 c.	2.005 c.	2.016 c.
Rate per ton-mile.....	0.913 c.	0.880 c.	0.881 c.	0.832 c.	0.834 c.
Interest per cent. of bonded debt.....	4.76 p. c.	4.89 p. c.	4.75 p. c.	4.88 p. c.	4.89 p. c.
Dividends per cent. of stock.....	2.46 p. c.	2.43 p. c.	2.40 p. c.	2.28 p. c.	1.95 p. c.

The statistics of street railroads are presented in the same comprehensive form as those of the steam lines, the scope of this department having this year been enlarged to cover all the roads in the country. The total length of the lines in the United States equals 15,956.13 miles against 13,176.38 miles in 1895, the latter sum being an increase of 3,514.32 miles over those in operation in 1891, so that in five years there have been built 6,294.07 miles of city and suburban tramway lines, the mileage added since our tabulation of 1895 was prepared being considerably more than the mileage of steam lines built in 1895.

It is impossible, owing to the meager information furnished by many companies, to supplement this statement of mileage with complete or satisfactory statistics of the equipment, capitalization or operations of the street railroads of the country. Such returns as have been received have, however, been totalized with the result of showing an equipment of 28,154 passenger cars,

20,777 motor cars, 206 dummies and 28,621 horses. The rapid substitution of electric traction for animal power may be judged from the fact that since 1891 the number of horses employed in the street-railway service has declined 162,000, or about 80 per cent.

Of the 15,956.13 miles of street railroads in operation, companies operating 530.71 miles failed to supply complete statistics of capitalization either as to stock, bonds, or both. The capitalization of the remaining 15,425.42 miles is therefore shown to be \$828,547,285 stock and \$525,949,928 bonds, an average of \$53,713 per mile of stock and \$34,066 per mile of bonds, equal in the aggregate to \$87,809 per mile of stock and bonds as against an average of \$60,188 per mile for steam railroads.

The following table gives information as to equipment which our readers often ask for:

EQUIPMENT OF UNITED STATES RAILROADS.

Year.	Locomotives.	Revenue cars.		
		Passenger.	Baggage, mail and express.	Freight.
1878.....	16,445	11,683	4,413	423,013
1879.....	17,084	12,009	4,519	430,190
1880.....	17,949	12,789	4,786	439,255
1881.....	20,116	14,548	4,976	448,295
1882.....	22,114	15,551	5,566	470,451
1883.....	23,623	16,889	5,848	477,683
1884.....	24,587	17,303	5,911	498,399
1885.....	25,957	17,290	6,044	505,519
1886.....	26,415	19,252	6,325	545,914
1887.....	27,343	20,457	6,554	580,387
1888.....	29,398	21,425	6,827	605,116
1889.....	31,041	22,885	7,053	651,169
1890.....	32,241	22,958	7,253	681,970
1891.....	34,022	24,497	7,368	710,304
1892.....	35,099	26,044	7,830	715,040
1893.....	36,436	28,624	7,805	720,476
1894.....	36,784	27,921	7,921	722,799
1895.....	37,090	27,979	7,891	720,817

The New England Roadmasters' Association.

The fourteenth annual convention of the New England Roadmasters' Association was held at the Revere House, Boston, Aug. 19 and 20, with the President, Mr.

A. C. Stickney, in the chair. Three sessions were held on the first day and one on the second. The afternoon and evening of the second day were occupied in an excursion to and dinner at Salem Willows.

The officers elected for the coming year were President, R. Hyland, Fitchburg Railroad; Vice-President Samuel Greer, New York, New Haven & Hartford; Secretary and Treasurer, F. C. Stowell, Boston & Maine. Executive Committee (in addition to the three officers above mentioned): Messrs. W. E. Clark, Vermont Valley; E. A. Haskell, Boston & Albany; E. H. Bryant,

New York, New Haven & Hartford, and John Walker, Boston & Maine.

Track Tools.—The first report submitted was on "Track Tools," the committee being Messrs. Stone and Shanks. The report expresses the opinion of the committee that it is economy for any railroad company to furnish the best and most suitable tools, and, further, that such tools can be better and more cheaply got of manufacturers who do this special kind of work. There was considerable discussion of this report, during which blue-prints were shown of tools used on the New York Division of the New York, New Haven & Hartford. The result was the passage of a resolution to appoint a

(Continued on page 606.)



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

The Manhattan Company and Rapid Transit.

At last the stage in the affair has been reached to which we have looked forward for several years. The Elevated railroad can now by a liberal and public-spirited policy rid itself for years, perhaps for a generation, of the one thing that has been the most serious threat to the value of its securities, the threat of an independent system. The city can now by a liberal and public-spirited policy, get an improved rapid transit service at no cost to the tax-payers and in less time than it could be got by any other means. Will the strong and broad-minded men now take control on both sides and bring together the conflicting interests and speedily find the simple way out of the tangle? We shall be very much surprised, but very much pleased, if they do.—*Railroad Gazette*, May 29.

When these words were written, the Appellate Division of the Supreme Court of the State of New York had just decided adversely to the proposition of the Rapid Transit Commissioners. This decision effectually disposed of the plan which the Commissioners had developed with much labor, care and ability, and at considerable cost. It seemed to leave the field clear for that compromise between the Commissioners and the Manhattan Railway Company, which has long appeared to be the most advantageous arrangement that could possibly be made.

Of course we recognized some of the obstacles to such a compromise. We knew the illiberal spirit in which certain controlling men in the Manhattan Company have always acted. We knew also that there are immediate financial reasons against increasing fixed charges and working expenses on the Manhattan system, particularly when such an increase is not likely to be followed soon by a sufficient gain in traffic to proportionately increase net earnings. We knew also the extreme difficulty of getting public opinion to approve of any arrangement with the Manhattan Company; but we hoped that the strong and broad-minded men, both in the Manhattan Company and in the Commission would find a way to conquer these difficulties. What has happened is essentially this:

The Manhattan Company submitted a plan which involved certain immediate extensions, both downtown and uptown, and which suggested further extensions at some indefinite time "when the need arose for them." The plan also contemplated increasing the tracks on certain existing lines so as to permit the running of more express trains. With regard to a certain part of the immediate extension, officers of the company said that it had not been determined whether this should be in tunnel or on the surface.

The Commissioners refused the application of the Manhattan Company, and the grounds of that refusal are given in a letter from the President, Mr. Orr, dated Aug. 6. Among many remarkable features of this application Mr. Orr pointed out that it was expressly declared that the application was based on assurances that substantially no claims would be made for land damages. But the Board has no power to assure any such immunity. The application covers the occupation of upward of 30 miles of street, with new rail-

road and additional tracks on upward of 25 miles of existing structure. There could be no voluntary agreement of all the property holders not to claim damages and no other assurance is possible. The Board asks that in this particular the application be made absolute and not conditional upon a matter beyond its power.

Again, the application asks for permission to build a railroad on the surface of a street; but the Board is expressly forbidden by statute to grant any such right. The suggestion is made that the Legislature will make the necessary amendment to the law; but the Board cannot know what view the Legislature will take, and can neither make nor consider any agreement which it has not actual power to make. The result of acting on the expectation of legislation would simply be delay.

Furthermore, considering the new lines proposed, to grant this application would put the entire future of rapid transit by elevated railroads in the control of the Manhattan Company, and the Board wishes the company to say definitely what portions of the lines applied for it would build without regard to the action of the Board on other parts.

The application makes no promise to build any of the new road or additional tracks in case the franchise is granted. It says nothing of when any new road or addition will be built. It provides for no redress in case the agreement is made but not performed. In other words, the application simply asks for a five years' option, which must go a long way to prevent rapid transit work by the city or by other individuals. But the Board cannot grant an application unless upon a binding and enforceable obligation to promptly begin work, and to finish it with reasonable speed.

An application which leaves any vital article untouched can serve only to commence a discussion, in course of which the company will remain morally, as well as legally, uncommitted, and by which no progress will be made in actual work. "Every futile or prolonged negotiation with any particular applicants inevitably tends to delay or defeat solution of the problem by some one else."

After this analysis, another word is almost superfluous. We cannot doubt that the Manhattan officers made an application which they knew could not be accepted. With the legal and business ability at their command they could not have submitted such a document in good faith; that would be puerile, and those gentlemen are not puerile, whatever else they may be. They have an enormous interest in retarding the efforts of anybody else to build a new rapid transit road or system, and in delaying as long as they can the expenditure of money in the extension of existing systems. It is perfectly plain that their tactics are designed to delay both of those events. Such tactics may still succeed for some time to come, but, obviously, they must have an end, and of course the present owners of the majority of the securities of the Manhattan Company foresee as clearly as anybody else what that end will be, and they are as well able as anybody else to prepare for it.

Meantime, we are disposed to abandon the belief, which we have maintained for several years, that the rapid transit difficulty in New York City can be best met by an agreement with the Manhattan Company. Or to express the idea a little more accurately, while it could be thus met, there seems to be no reasonable ground to suppose that it will be until the policy of that company is radically changed. That radical change may come through a change in ownership, or because another and independent system is seen to be immanent. We see no other way: and meantime the Rapid Transit Commission is in a very hard position.

The Grain Exporters' Complaint.

The agitation of some of the grain dealers of New York City concerning the alleged injustice of the rates charged by the railroads on wheat, corn and oats from the West, has finally been made the subject of a formal application to the Interstate Commerce Commission for relief, the complaints made to the officers of the individual railroads and to the Joint Traffic Association evidently having failed to accomplish anything. The complaint now entered at Washington is made by a committee of the Produce Exchange, of which Mr. Henry Hebert is chairman. It names as defendants all of the roads in the Joint Traffic Association and, in addition, the Boston & Albany. The principal paragraph reads:

The trade advantages of New York afford it exceptional facilities for handling goods from the primary markets of the country. New York is favored by its great concentration of business, by its large commercial population, by the fact that it possesses the greater portion of the import trade from foreign countries, by its greatly superior ocean service, its unrivaled harbor and many miles of water front, wharves, docks, warehouses,

and other terminal facilities. These advantages, due in great part to public and private enterprise and expenditure, are sufficient, under equal conditions, to draw to its port by far the greater part of the export trade of the United States. Philadelphia, Baltimore, Norfolk, Newport News and Boston are seaport towns and competitors with the city and port of New York for the export trade of the United States. It is unlawful for the railway companies to give to said localities any undue or unreasonable preference or advantage over the locality of New York, or to subject the locality of New York to any undue or unreasonable prejudice or disadvantage in any respect whatsoever in comparison with such other localities.

The rates from Chicago to the several ports (New York, 20 cents; Philadelphia, 18 cents; Baltimore and Newport News, 17 cents) are quoted, as also the rates on provisions; also the rates from Erie and Buffalo on grain for export, which are 1 cent a bushel less to Philadelphia and Baltimore than to New York. Quotations from tariffs are given, showing that export grain is carried to Boston cheaper than that for domestic consumption, and it is stated that the railroads at Boston give 20 days' free storage and 20 days' free insurance, privileges not granted at New York. Complainants believe that some shipments are stored at Boston free for 90 days. It is alleged that the lower rates to the more southerly ports unjustly and unlawfully divert from New York the commerce which would naturally flow to it, and that they have been very injurious both to New York and to producers at interior points. It is alleged that the action of the roads in forming the Joint Traffic Association has aggravated their offense.

So far as can be learned from the published accounts, the complaint cites no specific losses or diversions of business, but Mr. Hebert gives to the newspapers a statement showing that the sales of grain at the New York Produce Exchange for the months of May, June, July and August have been very much less than in previous years. This statement shows:

SALES AT NEW YORK, MAY TO AUGUST, INCLUSIVE; THOUSANDS OF BUSHELS.			
In years.	Wheat.	Corn.	Oats.
1892.....	350,854	99,718	37,012
1893.....	436,633	65,374	30,743
1894.....	515,960	42,542	22,831
1895.....	834,108	57,375	26,427
*1896.....	313,192	24,611	14,577

*To August 19, inclusive.

As these figures include the speculative sales of the gamblers, as well as the legitimate transactions, it is difficult to see what value they can have except to show the degree of excitement prevailing in the market. The actual movement of grain is the only true criterion. It is hardly worth while to make extended comparisons, but for one month, June, we notice that the exports of corn compare with Mr. Hebert's figures as follows (thousands of bushels):

	June, 1896.	June, 1895.
Sales at Produce Exchange.....	6,192	12,210
Exports from New York.....	2,542	1,529

How much importance should attach to this complaint we cannot say, for we do not know what portion of the grain dealers of New York City are interested in it. We understand that those doing a large amount of business send grain via Baltimore or Newport News as freely as via New York. For such, the competition of the railroads is an advantage rather than otherwise, for it tends to reduce the total cost of moving the grain from the field to the consumer. Indeed, the only important legitimate reason for demanding the shipment of grain through New York, as a right, is to give work to the men engaged in transferring the grain from the cars or canal boats to the ocean vessels and to pay the rent of the elevators in which some of the grain is temporarily stored. Even that "right" is seen to rest on a slim foundation when we consider that any one has an equally good right to build storehouses and hire laborers at Newport News or Galveston or anywhere else.

But whatever the merits of the present complaint, it presents a typical case, and it will therefore afford an interesting subject for the Interstate Commerce Commission to exercise its wisdom upon. While it may be that some of the traffic officers have pursued unscientific methods in forming their opinions of what, in fairness to themselves, the shippers and the general public, they ought to charge on export grain, the inquiry must result in showing that this field of export traffic is one where commercial forces ought to be allowed to automatically work out their own results, and that it is a field where it is practically out of the question to do anything else.

The complainants say that New York's advantages ought to draw business away from other ports not possessing similar advantages; but of course these merchants must know that that is just the argument Baltimore or Newport News wants to sustain its claim to railroad rates which shall give an advantage over New York. The Southern merchant says to New York: You, having elaborate facilities, can do business at low rates, and so you have a great advantage over me; consequently, I must reduce my rate in order to attempt to get even with you. Being unable

to reduce the cost of handling the grain at my port, I call upon the railroad to take up my cause.

One of the advantages which the New York men say they possess is an unrivalled harbor; but, as has recently been shown, this advantage in a measure defeats itself. The harbor of New York is so large and competition in shipping has been carried on so many years that ocean vessels can get loads in a dozen or a score of different places on the shores of that harbor. This compels the railroads, at considerable expense, to carry grain to the ships in lighters. It is true that this custom of carrying grain to the ship originated with the canal boats, which can go to one point of the harbor as well as to another, but the railroads seem to be forced to conform to the custom nevertheless. On the other hand, Boston and Baltimore and Newport News have cheap facilities for the rapid transfer of grain directly from the cars to the ocean vessel. There are similar cheap transferring elevators in New York harbor, but, as already stated, the customs of trade have become so settled that the ocean vessels do not go to them. If the harbor of New York is unrivalled, it is in the element of competition; the shipper has a wider range of choice of vessels. This must tend to reduce the rates of ocean carriage; but when it comes to full shiploads, with numerous ships famishing for freight, freedom of competition is not confined to New York; it breaks away from its bounds and ships are as ready to go 300 miles out of their way, to get a load at Newport News, as to go 10 miles out of their way to some unusual point in New York harbor. To ship grain profitably from such a place as Newport News, where there is very little competition as compared with New York, it is necessary to send it in full shiploads and to make the engagement long enough beforehand to give an opportunity to ships not waiting at Newport News, but tied up at Liverpool, to bid for the freight. But with a large grain crop, making buying easy, and a constant supply of tramp steamships, the necessary condition is fulfilled.

The complaint cites the fact that grain is carried from Buffalo and Erie to Philadelphia and Baltimore cheaper than to New York. Wheat goes to New York at 5 cents a bushel and to the other two ports at 4 cents. The Pennsylvania takes grain from Erie and has induced or compelled the Buffalo-New York lines to grant it this differential of one cent; and this, the merchants say, is an unlawful discrimination. Possibly it is unreasonable, for the Erie Baltimore rate is equal to about 3 mills per ton per mile, while the Buffalo-New York rate is equal to about 3.8 mills; but this difference does not make it contrary to law.

The fact that in rate matters the competing railroads often, or generally, act together seems to be the source of a good deal of confusion in the minds of the merchants. Their whole complaint seems to innocently assume that because the railroads now do act together, they always can do so with the same harmony as now. At present the New York Central and the Erie seem to be cheerfully acquiescing in the action of the Pennsylvania in making a rate from Lake Erie to Baltimore, which takes grain away from the New York roads and their port, and the merchants seem to think that it would be just as easy to make the rate 4 cents to New York and 5 to Baltimore as to have it 5 to New York and 4 to Baltimore, if only the railroads saw fit to so arrange it. The *Journal of Commerce*, in an editorial on the subject, begins with the assertion that the Produce Exchange has made out a *prima facie* case of unlawful discrimination against New York. Where is the law which condemns the present rates? Assuming every statement of fact in the complaint to be true, which one of them shows any infraction of any statute? The Interstate Commerce law makes unjust discrimination unlawful, but when it comes to deciding the justice of the existing rates, Baltimore and Galveston will have to be heard as fully as New York. And, by the way, the most grievous offense (in summer), that of the Buffalo-New York roads in maintaining rates higher than those of the Pennsylvania to Baltimore, does not come within the jurisdiction of the Interstate Commerce Commission, for traffic between Buffalo and New York is not treated as interstate, even where it goes through New Jersey. The fact is that the Pennsylvania is no more bound by law to heed the wishes or the interest of the New York Central in making its rate on corn to Baltimore than is the Gulf, Colorado & Santa Fe in making its rate on corn from the interior of Texas to Galveston. In both cases a reduction tends to take away business from New York and in both cases New York must defend herself by giving better service or lower prices. And it cannot be doubted that the railroads leading to New York will do all they can to aid

the merchants of that city in such a fight. They certainly must desire to promote the general prosperity of their chief terminus, and if they think that they can use their cars and engines and other existing facilities to better advantage in carrying other things than in carrying grain at three mills per ton per mile, it is at least open to question whether any one can prove that they are wrong.

In view of the course of the New York railroads during the past dozen or fifteen years in their dealings with the New York merchants it is no more than fair to assume that in settling the Lake Erie differential with the Pennsylvania they made it just as small as they could. That the railroads are not the only traitors to be found in the New York camp is shown by the action of the canal-boat men in standing together this season in demanding 4½ cents a bushel on wheat to New York, a rate which, the newspapers say, is not high enough to meet the competition of the all-rail line to Baltimore. On the question of rates from Chicago and beyond, the Illinois Central, carrying grain from Iowa to New Orleans at exceedingly low rates, and apparently so well satisfied, even with the present small profits, that it is increasing its railroad facilities and enlarging its elevator capacity at New Orleans, seems likely in the long run to injure New York's trade as seriously as any of the roads aimed at in the present complaint, so that we forbear to tackle the question. The Interstate Commerce Commission will have to digest a pretty large mass of facts if it is to ascertain the true equities in the case.

The gist of the conclusion reached by the *Journal of Commerce* is, that if the Interstate Commerce Commission cannot keep the Southern lines—the Chesapeake & Ohio, for instance—from reducing rates as far below those to New York as may be necessary to get a good share of the business, that tribunal had better shut up shop. This is adding insult to injury. For the people of the United States, after prodding the Commissioners for ten years to make the railroads reduce rates, to suddenly turn around and require them to change all their habits of mind and *prevent* reductions, is bad enough; but to kick them out of office for failing to accomplish impossibilities is base ingratitude. The *Journal of Commerce* partially recognizes the difficulty before the Commissioners, for it presents the argument in this way:

"The ground on which the roads south of us claim a differential is that they are shorter, and therefore can and should be allowed to haul for less. To this we make two responses; the railway companies have never admitted that charges should be proportioned to mileage, and if charges should not be proportioned to mileage obviously differentials should not be; besides this, distance is only one of the elements in the cost of hauling; curves and grades count for much. If the roads leading to New York are longer it is equally true that they are easier; it is far from certain that the roads south of us can haul more cheaply than the roads that lead direct to this port. It is also true that a differential of 15 per cent. in favor of Baltimore is out of proportion to the difference in distance, and these differentials were fixed long ago, when rates were higher than now; the reduction of rates has left the differential an unreasonable percentage of the full charge."

All of which suggests, what every one admits, that the size of the differentials has been, and in all probability always will be, decided by might and not by right. Might in this case does not mean brute force, for it is modified by discretion and includes diplomacy as well as material forces. And right is not subdued or overborne because of a disposition to disregard the moral law, but because, in consequence of the complexities of business, and of the fact that what is right at one time is wrong at another, no one can conclusively settle the question of right by any rational process. If the Chesapeake & Ohio Railroad pursues a fair policy toward the people of the states which chartered it, it is hard to see how it can be justly forbidden to carry Nebraska corn to Newport News at a profit of ten cents a car, if it finds it to its interest to do so; and in considering a request from New York to raise its rate it must be governed, not by what it *knows* of the cost of carrying to New York or of the demand for corn at that port, for it does not possess any definite knowledge on those points; but by what it *thinks* the New York roads will ask for carrying grain (or, what is the same thing, by the degree of persistency with which it thinks they will maintain their demands). How can the Interstate Commerce Commissioners, or any one else, decide such a question except by the usual processes of negotiation and compromise?

Net Earnings for the Six Months to June 30.

The returns of railroad net earnings for the six months of this year, compiled by the *Financial Chronicle*, show a slight improvement over the previous year (3.71 per cent). The gross earnings to July 1 are given as \$404,420,000 an increase of 4.64 per cent. These reports are for 181 roads in 1896, operating 128,529 miles of road, about 565 miles more than the 1895 reports cover. The actual increase of earnings is \$17,917,000, whereas in the *Chronicle's* earlier report

of gross earnings, 120 roads operating 95,600 miles, reported an increase of \$15,268,000 which was 6.8 per cent. Thus the later returns of earnings were distinctly unfavorable, the percentage of increase being reduced 2.3 per cent. by including these late reports.

We have already pointed out, in reviewing the returns of gross earnings for the half year, the special features influencing railroad earnings; a large grain traffic and particularly a very large spring wheat crop, which increased the earnings of Northwestern lines, and a heavy decrease in the cotton movement. There was an absence of the demoralizations following rate cutting, and the roads have had no extraordinary expenses for repairs for damage caused by storms. As the year has advanced the trade conditions throughout the country have been reflected in railroad earnings, and the decrease has become serious and marked in the weekly reports of August earnings on most roads. The increase of 3.71 per cent. in the net earnings of the six months of 1896 compares with an increase of 7.12 per cent. in 1895 over 1894, but last year gross earnings were but 3.56 per cent. better than in 1894.

The reports of net earnings by months show some interesting results. Gross earnings had been increasing each month in the latter part of 1895, and in the first months of this year the increases had become quite large. In January gross earnings increased 8.9 per cent. and in February 9 per cent. but the increases in net were 16.9 and 17.9 per cent. respectively. These results seemed to confirm the general belief that the railroads, after nearly three years of poor revenue, were to have a steadily increasing income. This conviction resulted in improvements being started, and the rate of increase of net earnings fell off considerably as compared with gross. But the conditions changed for the worse quickly and in May net earnings showed a higher percentage of increase than gross. In June the increase was 5.43 in gross and 4.06 in net. For the six months, as stated, the percentage of increase is 4.64 in gross and 3.71 in net.

In looking at net earnings as distributed in the usual geographical grouping of the roads, the most marked features are the large increases of the Northwestern lines, \$1,277,000 or 7.71 per cent. in net, and the losses shown by the Anthracite roads, \$1,066,852 or 10.65 per cent. In the Northwestern group every road shows a substantial increase, and but three a loss in net. A number of the coal lines show increases the New York, Susquehanna & Western having \$75,000 gain in net. The New York, Ontario & Western and Delaware & Hudson lines also have increases in gross and net. The results of net earnings by groups of roads in 1896, and the increases or decreases, are as follows for the six months:

Roads.	1896.	Inc. or dec.	P. c.
New England.....	7 \$2,977,648	D. \$272,516	8.38
Trunk Lines.....	14 35,895,136	I. 1,017,311	2.92
Anthracite.....	12 8,945,379	D. 1,066,852	10.65
Middle.....	19 1,531,557	D. 185,143	39.2
Middle Western.....	29 6,728,247	I. 135,829	2.99
Northwestern.....	15 17,857,896	I. 1,277,016	7.71
Southwestern.....	18 7,554,580	I. 811,984	12.04
Pacific Coast.....	21 15,388,275	I. 1,043,293	7.27
Southern.....	42 12,347,497	I. 1,331,328	12.08
Mexican.....	4 3,520,848	D. 46,255	0.46

The largest increase reported was by the Atchison, Topeka & Santa Fe, \$305,000, which represented a decrease of about that amount in operating expenses, which were heavy in 1895, on account of improvements made by the Receivers. The Erie has an increase of \$195,000 in net, and \$167,000 in gross, and the "Soo" road is \$137,000 better off in net, with an increase in gross of \$172,000. The largest decreases in net were by the Southern Pacific, \$112,000 (gross having shown a loss of \$160,000), and the Chicago, Milwaukee & St. Paul, \$105,000, though gross earnings increased \$341,000.

R. R. B. Letters Again.

Hon. Charles Neilson, Acting Postmaster-General, has issued an order modifying the recent circular of the Postmaster-General concerning the carriage of railroad letters, the same being based on an opinion of Attorney-General Harmon, to whom the matter was referred at the request of the railroad companies. It is held that a railroad may carry, free, letters written and sent by the officers and agents of the company which carries and delivers them, about its business; and these only. Among other things, the circular says that the letters allowed to go free—

"may be letters to others of its officers and agents, to those of connecting lines or to any one else, so long as no other carrier intervenes. The moment this occurs, such other carrier is transporting letters for a third person, which is contrary to law."

"It is not lawful for a railroad company to carry outside of the mails letters not in government-stamped envelopes addressed to other companies, corporations or individuals operating car lines (either passenger or freight), hotels, restaurants or any other class of business connected or not connected with the railroad proper, but these other companies, corporations or individuals may carry their own letters under the limitations noted in reference to railroad companies."

"The monopoly of carrying the mails by the government is limited by law to letters and packets of letters only. Hence, not only railroads but others may carry

outside of the mails anything else if unaccompanied by matter having the character of a personal correspondence.

"Railroad and express companies and other parties carrying matter under seal will be held to know at their own peril the nature of such matter and whether it can be lawfully carried outside of the mails or not."

Mr. Neilson has also published an old ruling of the Department, permitting news manuscript for newspapers to be sent by baggage-men and express messengers.

It appears from the first paragraph that we have quoted that letters on joint business over more than two roads are practically prohibited. An officer of the New York Central in New York may send a letter to the agent of the Lake Shore at Buffalo, or Cleveland, or Chicago, but the Lake Shore must not carry New York Central letters addressed, for instance, to an officer of the Chicago, Rock Island & Pacific. No doubt Mr. Neilson's order is based strictly on the opinion of the Attorney-General; and, if it is necessary, in making the regulations to judge a letter solely by the information to be gained from its superscription, there are technical grounds for calling this rule reasonable; but practically it is absurd and unreasonable. It is right and proper for the legal officer of the Government to be strict in his construction of the law, but it is to be borne in mind that his very first dictum, that a railroad may carry its own letters, deviates from the rigid rule laid down by Congress. After such a beginning as that, any return to arbitrary strictness challenges criticism.

Railroads do not send, and do not wish to send, letters over roads other than those which do the business to which the letters refer. By all considerations of reason or common sense a tracer, or an inquiry concerning the correctness of a cash account, or any communication concerning passengers or freight transported between Boston and San Francisco, ought to be carried free over each and all the intervening roads which carried the freight or passenger; and this without regard to whether the letter be addressed to the second, the third or the tenth road in the series. If a road must not carry a letter except it is from or to one of its own agents, the Lake Shore agent at Buffalo will have to gather up all the letters received from Eastern connections for roads west of Chicago and enclose them in another envelope (or envelopes) to the agent of his own road in Chicago. It will be perfectly in accordance with the Government order to do this, for the letters will deal with the business of his own road, but it will be an unnecessary farce.

It is necessary in any event to trust to the honor of the person sending the letter, and it is hardly to be supposed that every agent retransmitting letters will take pains to critically examine their contents to make sure that his road is not carrying something that it ought not to. Take the case of an inquiry from John Doe, of Cos Cob, as to the delivery of the box which he sent six weeks ago to Peter Smith, Albuquerque. On its outward journey the letter will naturally stop at every point where the box was rebilled, and its transmission will thus be in accordance with the rule (though there are plenty of way-bills which go over more than two roads and which could be traced just as well, in cases of complaints like this, by direct communication to the destination of the way-bill); but the answer to the tracer ought to go back addressed directly from Albuquerque to the agent at Cos Cob. Is it worth while for the agents of the intermediate lines to examine and redirect all such communications?

We notice that some of those roads which have issued circulars (some roads have issued none whatever, and yet seem to survive) positively prohibit the transmission of personal letters between employees. This is going farther than the government requires, for with a stamped envelope such transmission is perfectly lawful. A road refusing to carry such a letter is meaner than the old farmer who would not carry the hired man, even when he "had his team all hitched up and was going that way."

Annual Reports.

Boston & Albany.—The report for the year to June 30, 1896, just issued, does not indicate any material changes from the results of 1895. This is not unusual, for the earnings and traffic movement of the company, generally show little change from year to year, under ordinary conditions. The period included in the company's last fiscal year was not very different in its industrial conditions from 1895, so far as it related to the business of the company. In the country as a whole we have had improvements in a few of the crops, and in the iron trade, but these did not affect this company to any great extent. The comparatively uniform results of operations are explained by the widely diversified industries of New England, and by the fact that a good share of the company's traffic is non-competitive. The road carries a considerable proportion of the flour, grain and provisions exported through Boston, but the report gives no statistics of this freight by itself.

The gross earnings were over 9½ million dollars, being larger than for several years, as were also operating expenses, the rate of increase being respectively 2.4 per cent. and five per cent. over 1895. Net earnings show a loss of about four per cent., though they are larger than in 1893, when gross earnings were over 10 millions.

General results of operations are given below with corresponding figures for 1895 and 1893, the latter year being taken because the results in several respects nearly approached those of the last year. In 1893 the

company's business had not yet begun to feel the effects of the demoralization which came later in that year.

	1896.	1895.	1893.
Gross earn.....	\$9,350,622	\$9,130,866	\$10,169,875
Oper. exp. and taxes....	6,911,815	6,579,361	7,750,089
Net earn.....	\$2,438,767	\$2,551,505	\$2,419,783
Rentals and interest.....	415,980	531,150	399,900
Dividends (8 p. c.).....	2,000,100	2,000,000	2,000,000
Balance.....	\$22,787	\$20,355	\$28,886

The gain in gross is entirely from better passenger earnings, for there was an actual decrease (about \$2,000) in freight and also in mail and express revenue, where the loss was \$70,000. The increase in passenger earnings was \$291,000 or 7.65 per cent. This represents an increase in passengers carried of 636,657, or over five per cent., and an increase in passenger miles of 18,467,397, or over eight per cent. Passenger mileage was in fact over 231 millions, exceeding by over two millions the largest figure the company has ever before reported. The gain has been in through passengers, the increase being over 27 per cent. But in 1895 the number of through passengers was less than in other recent years, the figures for five years being: 1896, 123,072; 1895, 96,867; 1894, 110,072; 1893, 114,612; 1892, 114,675. The increase over 1893 is nine per cent. These figures include all classes, but emigrant traffic is not very important, furnishing only 13,310 passengers in 1896, and 5,150 in 1893. Before the latter year over 6,000 emigrant passengers were carried yearly, and over 13,000 in 1887, so that in ten years the decrease has been proportionately great. It is of course due to the decrease in immigration to this country. The number of way passengers in 1896 was 12,665,255, an increase of but five per cent. The way passenger traffic was about the same as in 1893, the increase being but 2,000 or .25 per cent.

The through tonnage in 1895 formed 23 per cent. of the total freight carried, 4,122,412 tons. In 1895 it formed 24 per cent. and in 1893 25. So that it has remained at a nearly uniform proportion of the entire tonnage. We are able to separate east and west-bound freight and we find that on through traffic the westbound tonnage decreased 2.52 per cent from 1895 and 19.85 per cent. in comparison with 1893; eastbound through tonnage, which is over six times as heavy as the westbound, increased slightly, 17,112 tons or 2 per cent. over 1895, but decreased 3 per cent. as compared with 1893.

The eastbound through tonnage, as we have seen, is nearly six times as large as the through tonnage to the west, and the total tons moved (including way) is over three times as large, being 3,094,074 tons eastbound and 1,028,338 tons westbound. The increase in eastbound freight over 1895 is 80,000 tons, or three per cent.; but has decreased 8.68 per cent. if we compare with the tonnage of 1893. Westbound freight was 45,000 tons more than last year (4.5 per cent.), but 11 per cent. less than in 1893. The total number of tons moved was 4,122,000 in 1896, 3,994,000 in 1895 and 4,514,000 in 1893, the tonnage in 1896 showing an increase of three per cent. over 1895 but a decrease of 8.68 comparing with 1893. Ton mileage decreased 9.57 per cent. as compared with the latter year, but increased 2.78 per cent. over 1895.

The details of operating expenses show increases in all items except conducting transportation; we give some particulars:

	1896.	1895.	1893.
Maintenance of way.....	\$1,753,573	\$1,315,656	\$1,898,463
" equip.....	941,313	832,351	1,275,495
Conducting transportation.....	3,348,603	3,585,219	4,392,173
General expenses and taxes..	868,373	816,134	183,958

The equipment owned now stands as: locomotives, 242; passenger cars, 315; baggage and mail, 60; and freight, 6,709. This shows small increases over 1895 in locomotives and passenger equipment owned, but 171 less freight cars. The equipment in 1893 was, locomotives, 243; passenger cars, 303; baggage and postal cars, 56, and freight cars, 6,615; so that the company now owns but one more locomotive, less passenger equipment and 94 less freight cars than three years ago.

The great work on which the Boston & Albany is now engaged is that involved in the separation of grade crossings. Two such costly improvements near Boston are now going on; that at Natick is now about completed, and trains have begun running on the new tracks; the elimination of the crossings in Newton, which involves the lowering of the tracks for four miles, has been started. New freight yards will be laid out at both places, and the necessary land has now been acquired. Over \$389,000 has been spent during the year on the work at Natick, \$30,000 of this being paid for land; the amount expended during the year for the Newton improvement was over \$263,000, of which \$159,000 was for land. For the elimination of these grade crossings \$34,000 was spent, the total spent during the year on this account being thus \$686,024, which was included in expenses. Other extraordinary expenses were \$164,000 for new coal pockets, side tracks, etc.

Press despatches from Washington say that there is great apprehension in the departments that bids for the great government contracts will be much affected by the anxiety as to the outcome of the election. Contractors are afraid to make engagements while future prices are so uncertain. Of course, this is precisely the situation all over the country. No prudent man is buying or selling, borrowing or lending, or involving himself in any long engagement if he can help it. One has but to walk through the markets in the great centers to learn this. Or he can if he likes consult that excellent barometer, the reports of bank clearings. Last week the *Chronicle* reported the total clearings as 9.7 per cent. less than for

the same week of 1895, and 3.2 per cent. less than the week before. In the seven cities where most of the business is done the decrease from last year was 11 per cent.

NEW PUBLICATIONS.

The Scientific Publishing Company announces that Volume IV. of "The Mineral Industry" is now ready, bringing the history and statistics of all branches of that industry up to the end of 1895. The price of the volume is \$5. The address of the company is 253 Broadway, New York.

The New England Roadmasters' Association. (Continued from page 603.)

committee to further investigate this subject and to make a report at the next convention.

Rail Joints.—The committee on "Rail Joints" consisted of Messrs. Shanks, Hyland, De More and Osgood. A majority report was submitted, signed by all of the members of the committee. The committee had tried only two joints, these, apparently, having been the only ones offered for trial. These were the Weber and the Continuous. They considered that either of these joints is an improvement over the ordinary joint, but for strength, simplicity, wearing quality and economy in maintenance, the majority believed that the Continuous joint is preferable.

Mr. De More (who signed the majority report also) submitted a minority report. His experience with improved joints had been confined mostly to the Weber, but he had seen the Continuous in track. He found after inspection of a number of both kinds the following defects in the Continuous: Imperfect surface, unequal pressure on base of rail, difficulty in putting on the joint. The imperfect surface is, he is informed through men engaged in such business, inevitable, as a perfect fit cannot be secured in a joint designed to support three points at once. As the Continuous joint leaves about an inch unsupported directly under the web of the rail, the pressure of the rolling load would have a tendency to cause fracture of the rail base. Finally, in order to put on the joint, the rails must be true to surface and as this condition of affairs is not always obtained, great difficulty will be encountered.

The only objection that he has been able to find to the Weber is the number of pieces. But this is not so serious a defect as those mentioned in the Continuous, as the parts are simple and easily adjusted. Several of the Weber joints have been in use on the New York, New Haven & Hartford for six years, and in crossings for three years, where angle bars would not last six months. The Weber joints had given perfect satisfaction. He heartily recommends the Weber as an improvement over any other joint now in use.

Elevation of Curves.—The committee on this subject consisted of Messrs. Parlow, Tuttle, Glynn and Cran. The committee approves of curve easements, and holds that the elevation should begin to run off at the same point on the curve where the easement begins. It should run off one-quarter of an inch to 30 ft. On very sharp curves, however, this would perhaps not be enough. They are not in favor of elevating any curve more than 6 in. where 35 miles an hour is the maximum speed. For that speed they would elevate 1 in. for each degree up to 3 deg., and ½ in. for each degree above that. For 60 miles an hour they would elevate 1 in. for each degree up to 5 deg.; they would elevate the outer rail rather than depress the inner one.

Repairing Washouts.—The committee on this subject consisted of Messrs. Greer, Sullivan and Paxson. Washouts are so variable in character that it is difficult to make a set of rules to go by. For temporary repair where the top of an embankment is cut away to a depth of from 1 ft. to 6 ft. they would build temporary piers of crossties, resting the track stringers on these, and where other material is not obtainable crossties can be used for stringers by putting the piers close enough. For washouts and bridges carried away where water is deep and the bottom uneven, they would use trestle bents without sills, thus permitting each post to find its own footing. In soft bottom, with much water, they would drive piles, four to a bent, 15 ft. centers.

A very difficult class of washout to deal with occurs in winter, when a river or creek flowing parallel to a bank washes away a portion of it. This can be dealt with by trestling, using short sills for one or more of the trestle posts, letting the cap rest on the portion of the bank remaining. It is not desirable to leave blocking in the track above the frost line, as this will make trouble when the frost goes out.

The great majority of the washouts, in New England especially, are small, but of course these are as dangerous to trains as big one. The track force should be drilled and be able to take care of small washouts without waiting for a repair gang and for supplies. Much can be done to prevent washouts by protecting weak places and a perfect system of patrol and inspection should be adopted during storms and high water.

How to Secure Better Rails.—The committee consisted of Messrs. Clark, Hyland, Curtis and Torr. The report is one of the shortest on record; it consists of three type-written lines recommending thorough inspection at the mill and on the ground and immediate report of all defects. This report was adopted, with an additional recommendation that in letting contracts a guarantee be required from the mill to replace any rails giving out inside of five years.

Automatic Switch Stands and Protection of Facing

Switches.—This committee consisted of Messrs. Haskell, Stowell, Melcher and Nickerson. The committee is of the opinion that automatic switch stands are desirable, but only those should be used which have the perfect action given by comparatively recent improvements. The committee would hardly recommend as preferable to the ordinary rigid stand those automatic stands of the "fly-back" variety having the automatic spring in the connecting rod, which allows the stand to be locked whether or not the points are home. But the committee favors those recent stands which embody inability to be thrown and locked unless the switch points are home, and also have positive and simultaneous action between the switch points and the target, so that the target gives a never-failing indication of the position of the points.

For the protection of facing switches, the committee recommends a continuous metal plate, long enough to reach across the track and under the stock rails, instead of the first pair of slide plates ordinarily used. This should have shoulders high enough to engage the outside flange of the stock rails, and be punched to receive the braces. A lip may be turned at each end of the plate as an additional support to the braces. It is further recommended that all facing switches in main line be protected by home and distant signals, mechanically interlocked, and that in busy passenger yards the detector bar be used.

The association is on record as favoring a guard rail ahead of facing points, although this feature has met the strong opposition of able men. The committee regards the short guard rail as a commendable safeguard ahead of the open point of a turnout from the outside of sharp curves.

This report was adopted, but in the discussion the convention practically recorded itself as not favoring a guard rail ahead of facing points, except on curves.

Spring Rail Frogs.—The committee on this subject consisted of Messrs. French, Collins, Sibley and Brennan. They recommended that the rail used should be of first quality; the fixed rail parts should be bound together in a most reliable manner; the two rails of the point should be fitted with a view to saving the strength of the main piece; there should be a full plate under the frog and spring rail, riveted to the rigid rail, extending beyond the point toward the heel, to insure proper movement of the spring rail and to keep it level with the frog point. This plate should be from 3/4 to 1 in. thick and at least 3 ft. long. The spring rail should extend along the side of the point toward the heel, not bending out to make the guard flare until more of the point than any wheel tread can cover has been lapped by the fit of the spring rail. The spring rail should be provided with devices to prevent it from being thrown out or moved by wheels of main line traffic into a position where it cannot carry wheels from the point to the rail beyond the frog. The lack of such devices has been the cause of derailments. These devices must resist the tendency of the spring rail to get above the level of the point rail and the tendency of the spring rail to roll as the wheel moves it out, and must keep the spring rail from getting further away from the point than the width of the safe flangeway of a rigid frog. The spring rail should be reinforced by a strap or otherwise to hold it if a break occurs in its length. The spring should be between the point and the mouth of the frog. There should be an additional device at the extreme end of the spring rail to keep it down on a level with the point rail in case the primary device for this purpose should break. There should be an anti-creeping device attached to the spring rail; and finally, at the mouth end of the spring frog, the inside rail should be enough longer than the main track rail to allow square joints at the heel of the flange; that is, with a No. 10 frog the inside rail should be about 2 in. longer than the main track rail. This report was adopted with the exception of a few minor amendments of details.

Fire Claims.—The committee consisted of Messrs. Sargent, Walker, Hutchinson and Jones. The committee believed it impossible to adopt a method by which all such claims should be satisfactorily adjusted, but suggested that the best way to appraise and settle damages by fires is for the Roadmaster and the owner of the property to act together, appraising the property and negotiating settlement. But in case the owner and roadmaster fail to agree, they should call upon a referee. In this way 80 per cent. of the claims of this class could be settled, with a saving to railroad companies of at least 25 per cent. as against settlements made by claim agents. The clause providing for referees was stricken out of the report, which was then adopted.

EXHIBITS.

Ramapo Iron Works, Hillburn, N. Y.—Model spring-rail frog; switch stand.
 Pag. Woven Wire Fence Co., Adrian, Mich.—Model of Page wire fence.
 Fairbanks, Morse & Co., Chicago.—Model of the "Barrett Jack."
 Dulworth, Porter & Co., Pittsburgh, Pa.—Samples of Goldie perfect railroad spike and the Goldie claw tie plates.
 William Goldie, Jr., & Co., Pittsburgh, Pa.—Samples Goldie perfect tie plug.
 Weber Railway Joint Manufacturing Co., New York.—Several models and a large number of blue prints showing application of Weber rail joint to various sizes of rails.
 National Jack Co., Boston.—Samples of Pearson's car-replacing jack for street and steam railroads.
 Automatic Time Signal Co., Boston.—A working model of an automatic time signal.
 Pettibone, Mulliken & Co., Chicago.—Samples "Jenne" track jack of Alkins forged steel rail braces.
 A. O. Norton, Boston, Mass.—Samples of the Norton "Sure Drop" track jacks.
 Safford & Moore Ry. Jack Co., Chicago.—Samples of track jacks.

The McMullen Woven Wire Fence Co., Chicago.—A full-sized sample of railroad fencing.
 The National Lock Washer Co., Newark, N. J.—Samples of National lock washer.
 J. D. Reed, Roxbury, Mass.—A full-sized model of the J. D. Reed Perfect railway system.
 Elliot Frog & Switch Co., East St. Louis, Ill.—Model Eureka spring rail frog.
 Pennsylvania Steel Co., Steelton, Pa.—Model of the Long safety switch stand.
 Safety-Rail Joint Co., Chicago, Ill.—Full sized model of Niles safety joint.
 Wharton Railroad Switch Co., Jenkintown, Pa.—Samples of Keyless adjustable rigid frog; improved spring rail frog; automatic switch stand; sliding wing frog; improved Wharton switch; split switch tie clip or lug (made out of the solid), and a large number of drawings, etc.

TECHNICAL.

Manufacturing and Business.

The Q. & C. Company reports that its new works recently erected at Chicago Heights, a suburb of Chicago, are kept busy on orders for the railroad appliances and special machinery made by the company. Recent orders include six large metal-sawing machines, several of which will have saw blades 36 in. in diameter. The company finds a growing demand for these metal sawing machines equipped with electric motors, and all but one of the six machines referred to will be run by such motors. The advantage is in a considerable saving in the actual cost of running the machines with an equal efficiency. The company also reports its railroad equipment department busy. Its output of Servis tie plates this year will alone aggregate many millions.

The machine departments of the Springfield (Mass.) Foundry Co., and of the Valley Pump Co., of East-hampton, Mass., have been consolidated, and will be known as the Springfield Elevator & Pump Co., which will manufacture hydraulic, electric and power elevators, and the steam and power-pumping machinery formerly built by the Valley Pump Co.

A steamer is now loading at Philadelphia with the machinery ordered in the United States for the new locomotive works of the Sormovo Company at Nijni Novgorod, Russia. Some description of these new works and a list of the machinery ordered was published in the *Railroad Gazette* of July 10, page 485, and July 17, page 500.

The Ensign Mfg. Co., of Huntington, W. Va., has just received an order from the Western New York & Pennsylvania for one large size Russell wing snow plow.

The Consolidated Car and Truck Co. was incorporated in Chicago, on Aug. 20, with a capital stock of \$500,000, to operate street-railroad lines and make cars. The incorporators are George C. Mastin, Sherley Schooler and others.

The Cherry Valley Iron Co., of Leetonia, O., has contracted with the Washington Coal & Coke Co., of Pittsburgh, Pa., for 84,000 tons of run-of-mine coal for use in its bee-hive ovens.

Iron and Steel.

The plant of the American Steel Foundry Co., at Granite City, Ill., was closed on Aug. 13, owing to lack of orders. About 400 workmen were thrown out of employment.

The Midvale Steel Co. has finished plans for a large foundry of brick and iron, with a steel truss roof. It will measure 46 x 130 ft., will be one story high and will cost about \$35,000.

It is reported that Watts' furnace, in Middlesboro, Ky., will soon be blown in. The machine shops at that place are already in operation, and the steel plant will soon be started up again, to remain permanently in operation.

Throughout the Mahoning and Shenango valleys, orders at the different manufacturing plants are few, and only a small proportion of the plants are in operation.

The Bethlehem Iron Co., of South Bethlehem, Pa., recently shipped five complete 10-in. guns for the army to Sandy Hook, N. J. This was the first shipment of the 100-gun contract given to the company.

The Johnson Frog & Switch Works, South Chester, Pa., have received sufficient orders for the Reading subway improvement in Philadelphia, to keep them busy for months. Large additions to the plant will be made at once.

The Kansas City Steel & Iron Works, at Argentine, Kan., have been purchased by Iowa capitalists, who have formed a new company for the manufacture of steel. Among the specialties to be made is a patent car coupler.

The Illinois Steel Co. has leased the plant of the East Chicago Iron & Steel Co., and will soon put it into operation. This plant was recently placed in a receiver's hands.

On Aug. 24 the Union Steel Co., of Alexandria, Ind., went into the hands of a Receiver, Mr. Thomas K. Akin. The company is capitalized at \$1,500,000, and is said to have \$1,000,000 invested in stock, machinery and plant at Alexandria, which covers 30 acres and is a complete rail and steel concern. When in full blast the company employs 1,600 men.

New Stations and Shops.

The Baltimore & Ohio has decided to open the new Mount Royal Station on the Baltimore Belt road Sept. 1. It is not expected to complete the station by that time, but the train shed will be completed and the platform put in place. The other work can be carried on without interfering with traffic. All passenger trains on the Baltimore & Ohio will stop at Mount Royal

Station, and sleeping-cars for New York will be started from the station.

The machine shops which the Southern Railway has been building for several months, near Salisbury, N. C., and which it is stated will be the second largest machine shops in the South, are now practically completed, and a few days ago President Spencer and Vice-President Andrews inspected the works, and President Spencer set in motion the machinery of the plant. The town which is growing up around the shops, five miles west of Salisbury, has been named Spencer, in honor of the Southern's President. An electric railroad will be built to connect the new town with Salisbury.

The new freight house of the Cleveland, Cincinnati, Chicago & St. Louis, at East St. Louis, which is 614 ft. long and 50 ft. wide, was opened for business last week. It was built to replace the one destroyed by the storm in the spring. The other depot, which is 600 ft. long and 30 ft. wide, and the new roundhouse, which are being constructed, are well under way. The new buildings are more substantial than those that were destroyed.

The Intercolonial Railroad will erect a stone and brick station to cost \$40,000 at Moncton, N. B.

Interlocking.

A new machine of 76 levers has just been put in service at Glen Loch, Pa., on the Philadelphia division of the Pennsylvania Railroad. These signals control the junction of the main line with the Trenton cut-off. The machine will soon be enlarged by the addition of nine levers for the Newtown Square line.

A Western paper reports that the Pennsylvania has plans prepared for an interlocking plant of 133 levers to be located at Logansport, Ind. At this point the Chicago Division, Peoria Division, Chicago cut-off of the Michigan Division of the Vandalia, and the Toledo and Detroit divisions of the Wabash intersect with the main line.

Visibility of Lights at Sea.

A commission appointed by the German Government to study the visibility of lights at sea has concluded, as a result of numerous experiments, that a white light of one candle-power is visible on a clear night at a distance of 2,800 yds., and at a distance of 1,760 yds. (one mile) on a rainy night. It was further found that when a white light of one candle-power was visible at one mile, one of three candle-power was visible at two miles, of 10 candle-power at four miles, and of 19 candle-power at five miles. A green light of one candle-power is visible at .8 of a mile, and in order to be visible at distances of 1, 2, 3 and 4 miles, it should be of 2, 15, 51 and 106 candle-power respectively. As regards green glasses of different shades, that called blue-green is the best, while for the red light a "copper red" glass is deemed best.—*Engineering* (condensed).

Diamonds in Steel.

A recent article in *Stahl und Eisen*, by Leon Franck, of the University of Berne, Switzerland, gives the results of the experiments made with the object of obtaining carbon in the form of diamonds from ordinary steel. He dissolved steel in nitric acid, and treated the residue successively with pure fuming nitric acid, hydrofluoric acid, and sulphuric acid and chlorate of potash. The final residue was found to contain minute diamonds, which, when unworked steel had been treated, were in the form of octahedra, and when hammered or rolled steel had been treated, appeared as splinters.

Temperature of Lake Waters.

The temperature of the water in the deeper parts of the great lakes differs little from the mean annual temperature of the air, the variation with increased depth being very small for points more than 400 ft. below the surface. In Lake Superior the temperature of the body of the water never rises above 46 deg. F.; at depths of over 200 ft. it varies but very little from 39 deg. F., going sometimes as low as 33 deg. F.; the same applies to Georgian Bay. In Lake Michigan, at the Chicago water intake crib, the annual average temperature of the water is 47 deg. F., while that of the air is 48 deg. F.; the total variation from the minimum (in February) to the maximum (in July and August) monthly temperature being for the water 34 deg., and for the air 52 deg. F. For Lake Huron during the summer the temperature of the air is 64 deg. F., and of the water both at the surface and at a depth of 300 ft., 52 deg. F., while at a depth of over 600 ft. it was 42 deg. For Lake Erie in August the temperature of the air at noon was 76 deg. F., while that of the water at the surface was 73 deg. F., and at the bottom a depth of 80 to 100 ft., 53 deg. F.—*Marine Review*.

The Cumberland Shops of the Baltimore & Ohio. The new terminals and shops of the Baltimore & Ohio at Cumberland, Md., which have been under construction several years, will be ready for occupancy Sept. 1. It is intended to concentrate as much of the repair work at Cumberland as is practicable. The third division, which now extends from Keyser to Grafton, will be changed so as to take in the road from Cumberland to Grafton. The division headquarters at Keyser will be removed to Cumberland. The latter city is also a terminus of the second division and the Pittsburgh Division. The buildings which have been erected at Cumberland include one of the largest roundhouses on the road. It is 360 ft. in circumference, with 44 stalls, and has a double-track entrance. Fire pits are provided and the building is heated by steam. It has an iron truss roof, covered with slate. The machine shop is 60 x 80 ft.; storeroom, 25 x 40 ft.; blacksmith shop, 70 x 45 ft., and the toolroom, 17 x 24 ft. Each building has an iron truss, slate-covered

roof. The shops are equipped with the most approved tools and the arrangement of the plant is designed for the most economical handling of materials. A steel coal trestle, with 52 pockets, has been built to supply locomotives with coal. Near by are a sandhouse, ash pit and water tank, so that locomotives can be quickly handled. Grading has been finished for a large freight yard to accommodate about 800 cars, and some of the track-laying is finished. Baldwin & Pennington, of Baltimore, were the architects of the buildings, and J. J. Walsh & Son were the contractors. A large turntable was constructed on the property by the Pencoyd Iron Works, of Philadelphia. The Pennsylvania Steel Company built the steel trestle.

Coal Production in 1895.

A report on "The Production of Coal in 1895," by Edward W. Parker, Statistician of the Division of Mineral Resources of the United States Geological Survey, has recently been published. The report deals exhaustively with the production, distribution and prices of coal in 1895, throughout the United States, besides giving statistics of the production of former years. Tables are also given, showing the world's annual production of coal, by countries, since 1868. The production in this country in 1895 exceeded that of any previous year in its history being 193,117,530 net tons, about 13 per cent. greater than that of 1894. In the classification of the states in order of their production, Pennsylvania leads, its output being 50,217,288 tons of bituminous and 57,999,337 tons of anthracite, about 57 per cent. of the total coal production; Illinois comes second, with an output of 9 per cent. of the total; Ohio third, with 8 per cent. of the total, and West Virginia fourth, with 6.9 per cent.

The table which follows gives the production in 1895 in net tons with its total value and the average price per ton, of some of the most important producing states:

State.	Net tons.	Total value.	Aver. price per ton.
Pennsylvania.....	50,217,288	\$31,980,357	\$.72
Illinois.....	17,735,894	14,239,157	.80
Ohio.....	13,355,806	10,618,477	.79
West Virginia.....	11,387,961	7,710,575	.68
Alabama.....	5,693,775	5,128,822	.90
Iowa.....	4,156,074	4,982,102	1.20
Indiana.....	3,995,892	3,642,623	.91
Maryland.....	3,915,585	3,160,592	.81
Kentucky.....	3,357,770	2,890,247	.86
Colorado.....	3,082,982	3,675,185	1.20
Pennsylvania anthracite.....	57,999,337	82,019,272	1.41

Another table shows the world's production of coal, as nearly as can be learned, for 1895, it having been necessary in some cases to use the figures of previous years, those for 1895 not being obtainable:

Country.	Tons.	Equivalent in net tons.
Great Britain (1895).....	gross 189,661,362	212,320,725
United States (1895).....	" 172,426,366	193,117,530
Germany (1895).....	metric 103,876,813	114,524,186
France (1894).....	" 27,459,137	30,273,699
Austria-Hungary (1893).....	" 30,449,304	33,570,358
Belgium (1895).....	" 20,414,849	22,567,371
Other countries.....		22,556,430
Total.....		628,865,239
Percentage of the United States.....		31

A Car-Replacing Jack.

During the convention of the New England Road Masters' Association at Boston the National Jack Co. gave a test of the "Pearson Car-Replacing Jack" in the yards of the Boston & Maine at East Cambridge. A large number of railroad men witnessed it. A standard box car of the B. & M. was thrown off the track and Mr. Pearson, with the assistance of one man, put it back on the rail. The device was highly commended, especially for use in yards and wrecking-trains.

Track Elevation in Chicago.

The city engineers of Chicago are now at work making the surveys along the line of the Chicago & Western Indiana, and the Pittsburgh, Fort Wayne & Chicago railroads. The City Council wants the roads to raise their tracks from Seventy-first street north. Efforts have been made on the part of the city to get these companies to agree upon a plan for elevating their tracks, but the railroads have never found the specifications acceptable. The present plan provides for raising tracks from Seventy-first street to Twenty-second street, and makes necessary the taking down of the viaduct at Thirty-fifth street and the construction of 38 subways at important street crossings. If the railroads in question refuse to adopt the plans now being made, the city will order them to proceed with the work, as the elevation must be commenced this fall.

New Ocean Steamships.

A large number of new vessels for transatlantic service are at present either under contract or being built for some of the leading companies which maintain a regular service to New York. The North German Lloyd Company is building nine new ships, including two fast twin-screw express steamers intended for service between Bremen and New York. One is being built at Elbaug and the other at Stettin. Of the other seven boats, four are intended for the transatlantic and three for Brazil service. The Hamburg-American Company expects to put in commission by October its new steamship Pennsylvania, which will be one of the largest vessels afloat, her loaded displacement being 20,000 tons. Her sister ship has just been contracted for, and will be built at Hamburg. The Hamburg-American Company is also building a fleet of six new ships for the Hamburg-Baltimore service. The Cunard Steamship Company has contracted with Workman, Clark & Co., of Belfast, for three new steamships for the Mediterranean service. The Netherlands-American Steam Navigation Company is building a new twin-screw boat 470 ft. long, 53 ft.

beam and 8,000 tons capacity. The American, White Star, Red Star, French and Anchor Line have at present no boats under construction.

The "Under-running Trolley" Patents.

A preliminary injunction was granted by Judge Green, of the U. S. District Court, on Aug. 11, restraining the Walker Company from using or vending certain improved suspended switches and traveling contact for electric railroads, the patent for which is claimed by the Thomson-Houston Electric Co. This suit is one of a number begun by the Thomson-Houston Company against different defendants throughout the United States and against whom injunctions have already been issued, as heretofore reported by us. Among the companies restrained by these injunctions are the Kelsey Manufacturing Co. and the Westinghouse Electric & Manufacturing Co. This patent is considered by the Thomson-Houston people as very essential for overhead electric systems, as its claims cover some of the essential features of the trolley system as it is in use today. The device was invented by Charles J. Vandepoele, and the patent (number 495,443) was granted April 11, 1893. The claim consists, in brief, of a post extending upward from the car and carrying a suitable bearing, an arm or lever carrying at its outer end a contact roller and pivotally supported in the bearing and provided at its inner end with a tension spring for pressing the outer end of the lever carrying the contact wheel upward against the suspended conductor. The novel element of "the overhead, under-running, spring-pressed, laterally swinging contact arm" was of great utility, and has superseded pre-existing attempts at trolley-road equipment. It will be remembered, however, that the United States Circuit Court of Appeals, on July 29, greatly modified the Townsend decision as to trolley bases and left the street railroad companies more free to buy where and of whom they chose.

Loading Long Materials on Cars.

The M. C. B. rules governing the loading of lumber and timber on open cars, and the rules governing the carrying of long structural materials, plates, girders, etc., have been adopted as recommended practice, and in accordance with instructions from the association at the time of the last convention, the secretary is prepared to furnish these rules, in one pamphlet, 6 x 9 in. with paper cover, at the same price that the rules of interchange are sold for.

The M. C. B. Letter Ballot.

The letter ballot lately taken in the Master Car Builders' Association resulted in the adoption of all the 43 questions submitted. It is impracticable to give even a synopsis of the numerous details decided, but they covered the following items:

Revision of the Standards and Recommended Practice. Mounting Wheels. Axle, Journal Box, Bearing and Wedge for Cars of 80,000 lbs. Capacity. Handholds and Height of Drawbars. Stenciling of Cars. Loading Lumber and Timber on Cars. Loading Long Structural Material on Cars.

Electric and Compressed Air Motors for the Manhattan Elevated.

Mr. William J. Fransioli, Acting General Manager of the Manhattan Railway, New York, has announced that the company has ordered built an electric motor engine, which, when completed, will be run experimentally on the Thirty-fourth street branch. The engine is being built in the shops of the company at Ninety-eighth street and Third avenue, under the supervision of the Electric Storage Battery Co., of Philadelphia, and obviously power is to be supplied by storage batteries. The cars drawn by the motor-engine will be lighted by electricity. A similar experiment is to be made with an air-motor engine, which is now being built at Rome, N. Y., by the Rome Locomotive Works, and is expected to be finished and ready for use in about two months.

The Manhattan Company has also invited from the leading electrical companies plans and estimates for lighting with electricity the cars on its whole system.

Strength of Welds.

Some experiments made at the engineering laboratory of the University of Michigan to determine the strength of welded joints are especially interesting. Of a number of the specimens tested not one broke in the weld; as some of these were slightly larger at the weld, a new set of specimens was prepared and a cut taken from each in the lathe to reduce the piece to a uniform diameter throughout its length between the jaws of the testing machine. Common round iron was used. Three bars were taken at random; 1½ in., 1 in. and ¾ in. in diameter. From each bar four specimens were prepared, one solid, one lap-welded, one butt-welded and one split-welded. The results show that only two specimens, both lap-welded, broke at or near the weld; the fracture in one case was slightly crystalline and in the other fibrous. The strength in no case departed widely from the strength of the solid parts. It would seem from these tests that with skillfully made welds we may expect to realize nearly the full strength of the original bar.

THE SCRAP HEAP.

Notes.

The Philadelphia Press has a Kalamazoo steam car for carrying newspapers between Portland and Easton, Pa., over the Bangor & Portland Railroad. The engine is of 10 H. P. and will carry a load of 3,000 lbs.

The trains of the New England Railroad now run to and from the Old Colony station in Boston, the Summer street station having been abandoned on Aug. 23, preparatory to the clearing of the ground for the construction of the new Union station.

The depression of the grade of the New York Central tracks at Washington and Main streets, Buffalo, west of the Union Passenger Station, has been so far completed that all trains now run on the new grade, though only one track has been put in use.

A show collision of locomotives was advertised to take place at Minneapolis, Aug. 29, and another is announced to come off at the Iowa State Fair, at Des Moines, Sept. 9. Texas papers report that the Missouri, Kansas & Texas Railroad will have a show of this kind.

Reduction of forces and of working hours in shops, and other measures of retrenchment have been reported during the past week on a number of railroads, among the more important being the New York, New Haven & Hartford, the Fitchburg, the New York Central and the Pittsburgh & Western.

Since the rigid enforcement of the law against the running of freight trains on Sunday at certain places in North Carolina the Southern Railway has refused to carry the merchandise of the Express Company on that day, except such as is perishable; and a citizen of Asheville has brought a suit in the State Court to test the law.

A local judge at Atlanta, Ga., has decided that the law of that State requiring separate cars for white and black passengers applies to street railroads. The decision was rendered in a test case brought in behalf of a colored man who was ejected from a car of the Atlanta Electric Railway for refusing to take one of the seats in the rear of the car reserved for colored people.

The Central of New Jersey, the Philadelphia & Reading road and the Baltimore & Ohio, operating the "Royal Blue Line" passenger trains between New York and Washington, have purchased from Pullman's Palace Car Co. the four dining-cars which have been in service on that line the past few years. The cars have heretofore been operated at a loss by the Pullman Company, and it is the intention of the "Blue Line" roads to make a number of changes in the service, which will reduce the expenses materially, and it is hoped to place the line on a paying basis. Mr. E. E. Brewer, Superintendent of Dining-Cars and Restaurants on the Baltimore & Ohio, will have charge of the Blue Line dining-car service. This arrangement went into effect Aug. 17.

A number of telegraph operators on the Union Pacific, acting in behalf of themselves and of the Order of Railway Telegraphers, have filed suit in the United States Circuit Court to compel the Receivers of the road to restore their wages, recently reduced. The suit is based on the order of Judges Caldwell and Riner in March, 1894, directing the Receivers not to reduce wages. The petitioners allege that the Receivers of the road have discharged leaders of their brotherhood without cause. They have also complained to the court about the assessments for hospital expenses, which, in their cases, are 40 cents a month. They allege that no accounting of the funds is made and that telegraph operators receive no benefit from the hospital except in the cases of individuals living in the towns where the hospitals are located.

Dubious Consolation.

A question which will occur to almost everyone, and which has already been debated more or less, is the effect which a change in our monetary standards may have upon export trade. If it is true, as has been generally claimed, that a change to a silver standard will lower rates of wages, measured on a gold standard, there appears to be good reason to believe that the American manufacturer would be in at least as good position to compete with his foreign rivals as he is at present. Further, in the general business depression which it is generally agreed must accompany a change in the monetary standard, manufacturers will have stronger incentives than ever to reach out for foreign customers while orders for the home trade are scarce.—Engineering News.

Boston Subway Bids Rejected.

The Boston Transit Commissioners, on Aug. 20, opened bids for section 5 of the subway. Only two bids were received: From the Metropolitan Construction Co., \$30,285, and from the W. F. Hedington Co., \$31,825. The Commissioners rejected the bids and called for new ones to be submitted by August 27.

Track Laborers Next.

A Chicago paper reports that the Chicago & Western Indiana, which owns the Polk street passenger station in that city the entire right of way, thence to Eighty-Third street, as well as the inner Belt Line around the city, has uniformed all its switchmen, switchtenders, crossing men, flagmen, grade-crossing policemen, stationmen, ushers, baggagemen and janitors. The new uniforms for the different classes of employees are as follows: Crossingmen—Blue coat and cadet gray cap with black band. Switchmen and switchtenders—Jumpers and blue cap with black band. Stationmen and Ushers—Blue suit and red cap with black band. Baggage-men and Janitors—Jumpers and gray cap with blue band. It is said that the Chicago & Eastern Illinois and the Chicago & Grand Trunk roads are now preparing to uniform their employees in a manner similar to that here described.

Lima Car Shops Burned.

The Cincinnati, Hamilton & Dayton car shops, of Lima, O., were destroyed by fire, with their contents, on Aug. 22. In addition to the machinery and tools, seven passenger coaches and 10 freight cars were ruined. The loss is estimated at \$60,000, only partially covered by insurance. About 150 are thrown out of employment until the company rebuilds. The company's shops at Lima were burned nine years ago.

The Bicycle on the Railroad.

A new terror is added to the life of the railroad man. Now he will have to look out not only for tramps and hogs and farmers at the crossings, but for the man who rides a bicycle on the rail. One Wilbur, of California, recently rode his bicycle behind a train, on the top of the rail, from Tiberton to Santa Rosa, on the San Francisco & Northern Pacific Railway, a distance of 45 miles. The rail head is two inches wide. He used a separate wheel to steady himself, which ran on the ties between the rails.

Corridor Cars in England.

The recent disagreeable incident in an English railway carriage, of which we spoke a few weeks ago, is not allowed to drop. The Board of Trade has addressed a letter to the Railway Companies' Association on the subject of assaults in railway carriages, and points out the fact that for many years efforts have been made to insure better protection to passengers, and inquires whether the companies have recently made experiments with electrical or other means of communication between passengers and guards and what the results have been. The Board of Trade is not aware whether or not the railroad companies propose to gradually supersede the ordinary form of carriage by the introduction of corridor cars.

Jersey City's Water Supply.

The Board of Street and Water Commissioners have recently received bids for a new water supply. The Board has been advertising for bids and receiving them at intervals for the last two or three years, but no bids have been accepted, and apparently no progress has been made toward obtaining a permanent water supply. The present bidders are the East Jersey Water Company and the Hudson & Rockaway Company. The East Jersey Company offers to furnish 20,000,000 gallons daily for \$35 or \$37 per million gallons, according to the source from which the water is taken, and \$36 or \$38 a million gallons for a supply of 50,000,000 gallons. The company will sell one plant for \$6,995,000, another for \$7,950,000 and another for \$7,990,000. The Hudson & Rockaway Company's prices are \$37 per million gallons for a 20,000,000 gallon supply and \$34 for a 50,000,000 gallon supply. The plant can be bought for \$7,400,000.

Lake Matters.

Freight on the Great Lakes is very dull. Now that the bottom has fallen out of the iron-ore trade comes the suspension of coal shipments up the lakes, and the reports on the coming grain crop of the Northwest indicate that there will be no rush to send it forward. Iron-ore shipments continue to drop and there is no place at the lower lake receiving docks for the handling of much ore. The dullness in the freight trade has its effect on the shippers, and there are but two or three vessels now under contract for construction the coming winter.

The Queen City, of the Duluth line, lately carried from Chicago 5,796 tons of corn. With this cargo the Queen City had a mean draft of 16.66 ft.

Two steel oil tank vessels, built at West Superior for the Standard Oil Company two years ago for lake service are on their way to the Atlantic, where they are likely to be used in the coastwise trade. They were built as experiments and now their places in lake service will be taken by two of the largest size, with a capacity of 750,000 gals. of oil each. The intention of the Standard Oil Company is to do away with rail transportation of oil from its Indiana works to the Northwest, as far as possible, by sending the oil in barges from Whiting to the head of Lake Superior, where it will be pumped into tanks and barreled for shipment to the company's distributing stations. The capacity of the tanks at Superior, Wis., has been increased.

New Haven Track Elevation in Boston.

The improvements on the Providence Division of the New York, New Haven & Hartford between Boston and Forest Hills, begun in June, 1895, have been so far completed that on Sunday last all trains were run upon the new high grade, two tracks having been completed throughout the length of the improvement, 4½ miles. The two old tracks, on the lower grade, lying mostly outside the former right of way, are now abandoned. The West Roxbury branch leaves the main line at Forest Hills and new interlocking signals are in use at that point.

For a considerable distance the new tracks are upon a wooden trestle, the limited width of the right of way making it necessary to defer the construction of an embankment until after the abandonment of the tracks on the old grade. For the greater part of the distance, however, the new tracks rest upon the permanent earth embankment, the retaining wall on the west side having been finished. At Boylston Station, the existing passenger house has been raised to the new level, a new first story being built. The station at Roxbury (on the east side) will be treated in the same way when the east half of the embankment shall have been completed.

This improvement was described in the *Railroad Gazette* of June 14, 1895.

Third Avenue Stock Increased.

On Aug. 19 the Third Avenue Railroad Co., of New York, increased its capital stock from \$9,000,000 to \$12,000,000. The increase is for the purpose of providing funds to meet an indebtedness of \$1,900,000, consisting of a floating debt, and \$1,000,000 for the extension of the company's system. As already mentioned in the *Railroad Gazette*, the Third Avenue road intends extending its lines from West 125th Street along the Boulevard and Kingsbridge Road across the Harlem River, and thence to the city limits. The acquisition of the Forty-second street line gives it a route on the west side in competition with the Metropolitan Traction Co. as far south as Fourth-second street, where it crosses to Third avenue, there connecting with its east side line.

LOCOMOTIVE BUILDING.

The Brooks Locomotive Works, of Dunkirk, have an order for two narrow-gage saddle-tank, standard-type locomotives, to be used on the Nanwa Railroad, in Japan. This is the first order the Brooks Works have received from Japan.

CAR BUILDING.

The Terre Haute Car Manufacturing Co. is building 150 refrigerator cars for the Vandalia line.

The Chicago & Alton is to put on a number of new dining cars on its trains between Chicago and St. Paul. The interior decorations of the new cars will be in cherry. The tables are set unusually far apart to give room for the large willow chairs which will be used.

BRIDGE BUILDING.

Baltimore, Md.—The County Commissioners have decided to build an iron bridge over George's Run, which divides the fifth and sixth districts. The bridge will have a span of 74 ft., with a width of 16 ft. It has also been decided to build an iron bridge over the mill race at Warren, in the eighth district.

Bellaire, O.—It is reported that 11 steel bridges will be built on the Bellaire, Zanesville & Cincinnati, between this city and Woodsfield.

Biddeford, Me.—Bids for a steel and iron bridge across the Saco River were received Aug. 14 as follows: Berlin Iron Bridge Co., East Berlin, Conn., \$2,993; Boston (Mass.) Bridge Works, \$4,000; J. E. Buddington, New Haven, Conn., \$4,554; Garratt-Ford Co., Pittsburg, Pa., \$3,283; Groton (N. Y.) Bridge and Mfg. Co., \$3,400; R. F. Hawkins Iron Works, Springfield, Mass., \$3,499; King Bridge Co., Cleveland, O., \$3,850; Geo. E. King Bridge Co., Des Moines, Ia., \$4,100; F. R. Long, New York, \$4,178; New Columbus Bridge Co., Columbus, O., \$3,850; Norton Iron Co., Everett, Mass., \$3,145; Springfield (Mass.) Construction Co., \$3,328. The contract was given to the Berlin Iron Bridge Co. at its bid of \$2,993.

Carlisle, Pa.—The County Commissioners will open bids Sept. 1 for a steel and iron bridge across Conodoguinet Creek, at Germeyer Mill. The bridge will have two spans of 122 ft. 6 in. and a 16-ft. roadway.

Easton, Pa.—The following bids were received Aug. 14 for the steel bridge over Martin's Creek, at Howell's: Berlin Iron Bridge Co., East Berlin, Conn., \$4,380; Groton (N. Y.) Bridge and Manufacturing Co., \$4,285; Horseheads (N. Y.) Bridge Co., \$4,725; King Bridge Co., Cleveland, O., \$4,400; F. R. Long, New York, \$4,500; Nelson & Buchanan, Chambersburg, Pa., \$4,350; Wrought Iron Bridge Co., Canton, O., \$4,150. The contract was given to the last-named bidder.

Florence, Ala.—The County Commissioners have awarded the contract for a steel bridge across Blue water Creek, at Allen's Ford, to the Toledo Bridge Co. The bridge will cost \$3,240. It will be 415 ft. long, with stone pillars and steel trestles.

Hightstown, N. J.—The Mercer County Board of Freeholders has awarded a contract to the New Jersey Steel and Iron Co., of Trenton, for a new bridge over Peddie Lake. It will cost \$10,640.

Hillsboro, N. Dak.—Bids are wanted Sept. 8 for building county bridges. Geo. O. Stommer, County Auditor.

Kansas City, Mo.—A new steel bridge is being built by the Metropolitan Street Railway Co. over the Kaw River. The surface work will cost \$53,000 and the elevated structure \$20,000. Work has progressed rapidly of late, and it is now thought that the bridge will be completed by Sept. 1.

Lauderdale, La.—The Mississippi & Lafourche Railroad, a new company, will build two bridges on its line, each with a draw span of 220 ft. long. Contracts will be given out shortly. R. W. Edwards, of Lauderdale, is President of the company.

Menasha, Wis.—Bids will be received until Sept. 8 for an iron bridge over Fox River. E. S. Little, City Clerk.

Middletown, O.—Bids for the Second street bridge have been considered as follows: Oregonia (O.) Bridge Co., \$1,575 for a bridge 52 ft. long with an 18-ft. roadway; Bellefontaine (O.) Bridge & Iron Co., \$1,495 for an 18-ft. roadway and \$1,480 for a 16-ft. one; New Columbus Bridge Co., Columbus, O., \$1,655.

Newark, N. J.—The plans of the county engineers of Hudson and Essex for the new Harrison-Newark bridge have been approved by the War Department at Washington, and work will begin at once. Specifications of construction will be advertised and bids called for. The bridge will cost \$100,000, which is to be divided equally between the two counties. The Fourth street approach in Harrison is almost ready for final grading and work on this portion of the bridge approach will be begun at once. On the Newark side but little filling-in will be required, and this will be done after the piers and masonry approach are constructed.

Newtown, O.—The contract for the superstructure of the new bridge over the Little Miami River at this place has been awarded by the Board of County Commissioners to C. H. Glandorf, at \$16,776.66.

Newville, Pa.—Nelson & Buchanan, Chambersburg, Pa., have the contract for the superstructure of the new bridge over Big Spring, at the eastern end of town.

New York.—Plans for the New York tower of the New East River Bridge were presented by the engineer, Mr. Buck, at a meeting of the Bridge Commission, on Aug. 19, and it was announced that he had thought it necessary to make several changes in the original plans. The Bridge Commission did not accept the plans, but referred them to Commissioners Baird and Reeves for investigation and report.

Pittsburgh, Pa.—The contract for the substructure and stone work on the Butler & Pittsburgh bridge, crossing the Allegheny River at Denny Station, has been awarded to Joseph Gianini, of Pittsburgh, for \$153,000. The bridge is one of the heaviest on the new line. The channel span is 500 ft. long, and the remaining three spans are each 350 ft. long. The bridge crosses Fourteen-Mile Island at a height of 90 ft., the total height of the piers being 100 ft. The bridge ends on the north with a trestle 45 ft. high and 1,400 ft. long. The steel superstructure will be built by the Carnegie Steel Co.

Rat Portage, Ont.—The bridge over the Winnipeg River at this place will be replaced by a steel structure at an early date.

Salem, Mass.—Reports state that an iron drawbridge to cost about \$25,000 is proposed for this place.

Shamokin, Pa.—A committee of councils has been instructed to receive bids for an arching or an abutment bridge over the creek from Rock to Shamokin street.

Sherbrooke, Que.—A steel bridge will be built to cross the St. Francis River, near the Oxford Mountain.

Upper Marlboro, Md.—The contract for two new iron bridges, one in Bladensburg and the other in Queen Anne District, has been awarded by the Prince George County Commissioners to Charles H. Smith, of Elkton, Md., for \$2,975.

Walkerton, Ont.—Messrs. Hunter Bros., of Kincardine, have been awarded the contract for a steel bridge over the Yokasippi River at Cargill, for \$1,175.

West Zorra, Ont.—The contract of the Fairview bridge in the fourth line has been let to Mr. Usher, of Thorold, Ont., and the Stratford Bridge Building Co.

Willoughby, O.—A bridge has recently been completed at this place over the Chagrin River by the Cleveland, Painesville & Eastern road. The iron span over the river is 200 ft.; over the highway, 170 ft., with a 700-ft. wooden trestle 40 ft. high. The cost was about \$40,000.

Windsor, Ont.—The project of the Michigan Central for building a bridge across the Detroit River has been favorably reported upon by the United States Senate. The structure will be 160 ft. high, with two piers 1,100 ft. apart.

MEETINGS AND ANNOUNCEMENTS.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Alabama Great Southern, annual, company's office, Birmingham, Ala., Oct. 7.
Central Vermont, annual, St. Albans, Vt., Sept. 9.
Chicago Great Western, annual, Chicago, Sept. 3.
Chicago, Indianapolis & Chattanooga, annual, The Denison, Indianapolis, Ind., Sept. 16.
Chicago, Milwaukee & St. Paul, annual, company's office, Milwaukee, Minn., Sept. 19.
Elgin, Joliet & Eastern, annual, Chicago, Sept. 15.
Great Falls & Canada, annual, company's office, Great Falls, Mont., Sept. 11.
Iowa Central, annual, Chicago, Sept. 4.
Louisville, New Albany & Chicago, annual, New York, Sept. 9.
Minneapolis & St. Louis, annual, company's office, Minneapolis, Minn., Oct. 6.
Nashville, Chattanooga & St. Louis, annual, Nashville, Tenn., Sept. 9.
New York, Susquehanna & Western, annual, Taylor's Hotel, Jersey City, N. J., Sept. 3.
St. Louis Southwestern, annual, company's office, St. Louis, Mo., Oct. 6.
Toledo & Ohio Central, annual, company's office, Toledo, O., Sept. 7.
Toledo, St. Louis & Kansas City, annual, company's office, Toledo, O., Sept. 9.
Wabash, annual, company's office, St. Louis, Mo., Sept. 8.
West Virginia & Pittsburgh, annual, Weston, W. Va., Sept. 1.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *American Association for the Advancement of Science* will hold its forty-fifth annual meeting at Buffalo, N. Y., Aug. 22-29.
The *American Street Railway Association* will hold its annual convention at St. Louis on Oct. 24 and 25.
The *Roadmasters' Association of America* will hold its next annual meeting at the Cataract Hotel, Niagara Falls, N. Y., beginning Sept. 8.
The *Traveling Engineers' Association* will hold its next annual meeting at Minneapolis, Minn., commencing Sept. 8.
The *American Institute of Mining Engineers* will hold its annual meeting in Denver, Col., beginning on Sept. 21. For provisional programme see issue of July 24, page 530.
The *American Society of Railroad Superintendents* will hold its next annual convention at Niagara Falls, N. Y., beginning Sept. 9.
The *American Association of General Passenger Ticket Agents* will hold its next annual convention at Atlantic City, N. J., beginning Sept. 15.
The *Traveling Passenger Agents' Association* will hold its next annual convention at St. Louis, Mo., beginning Sept. 29.
The *American Railway Association* will hold its next annual convention at New York City, beginning Oct. 7.
The *Freight Claim Association* will hold its next annual convention at The Jefferson, Richmond, Va., beginning Oct. 7.
The *Association of Railway Superintendents of Bridges and Buildings* will hold its annual meeting at Chicago on Oct. 30. For programme see issue of Aug. 7, page 560.
The *Master Car & Locomotive Painters' Association* will hold its annual meeting at the Park Avenue Hotel, New York City, beginning Sept. 9. For programme see issue of Aug. 7, page 560.

Road Masters' Association of America.

The programme of the fourteenth annual convention to be held at the Cataract House, Niagara Falls, Sept. 8, 9 and 10, 1896, announces that reports from committees on the following subjects are expected: Tie Plates, Robt. Black, Chairman; Best Method of Protecting Facing Point Switches, W. D. Otis, Chairman; Paper on Ditching, J. M. Meade, A. T. & S. F. Pueblo, Colo.; Elevation for Each Degree of Curvature, for Speed of 10, 20, 30, 40, 50, 60 and 70 Miles per Hour and the Advantages of Using Easement Curves, Garret Davis, Chairman; Latest Improvement in Frogs and Switches, J. A. Lahey, Chairman; Rail Joints, C. F. Blue, Chairman; Ballast, W. H. Courtney, Chairman. Advance copies of some of these reports have been issued by the Secretary. The Wagner and Pullman Palace Car companies will make the usual rate of one fare for round trip. J. B. Dickson, Sterling, Ill., is Secretary and Treasurer of the Association.

Traveling Engineers' Association.

The Secretary, Mr. W. O. Thompson, of Elkhart, Ind., has issued a circular in regard to the coming fourth annual meeting of the Association at the West Hotel, Minneapolis, commencing Tuesday, Sept. 9, at 9 a. m. A hotel rate at 50 cents less for each person per day than the regular rate has been secured for the best rooms, and a uniform rate of \$2.50 per day for each person (two persons in a room) for the other rooms in the hotel. On account of the large crowds which will be brought to Minneapolis by the annual gatherings of the Grand Army of the Republic and the Knights of Pythias, which come about the time of this meeting, it is desirable that hotel accommodation should be reserved by members as early as possible. The Pullman and Wagner Palace Car companies have granted half rates on their cars to and from the convention. Members traveling on Pullman cars will pay the full fare going to Minneapolis, taking a receipt, which, upon presentation to the District Superintendent of the Pullman Company at St. Paul, will be certified for the return trip. Members going by Wagner cars will pay full fares both ways, taking receipts, which should be sent to the Division Superintendent of the Wagner Company at the Temple Building, Chicago, and half the amount paid will be refunded.

PERSONAL.

—Mr. C. W. Risley, Superintendent of the Lima Northern, has resigned.

—The resignation is announced of Mr. C. W. Spencer as Superintendent of the Canadian Pacific's Eastern division.

—Mr. Charles W. McMeekin has been appointed Chief Engineer of the Iowa Central, with office at Marshalltown, Ia.

—Mr. A. G. Dunham, formerly General Manager of the Ohio Southern, has been appointed Special Master in the Baltimore & Ohio receivership.

—Mr. T. A. Clark has been retained as Chief Engineer of the new Nampa & Owyhee Railroad, in Idaho, the construction of which is about to commence.

—Mr. H. P. Eagar, late General Freight and Passenger Agent of the Chattanooga Southern, has been made Manager of the Chattanooga Car Service Association.

—Mr. J. M. Scrogin has been appointed Master Mechanic of the St. Louis Southwestern of Texas and the Tyler Southeastern, to succeed Mr. Thomas Inglis, deceased.

—Mr. William Brown, of Vancouver, B. C., General Western Freight Agent of the Canadian Pacific, died suddenly in Portland, Or., last week from inflammation of the stomach.

—Mr. Leonard F. Barton, formerly Roadmaster of the Louisville, Evansville & St. Louis road, has been appointed General Roadmaster of the Peoria, Decatur & Evansville, with headquarters at Mattoon, Ill.

—Prince Auguste d'Arenberg, the new President of the Suez Canal Co., is also the chairman of the French African Society of France. He was born in 1837, and served in the Franco-German war, commanding a division.

—Mr. A. R. Raymer, who has been Assistant Division Engineer, on the Lake Shore & Michigan Southern for about five years, has resigned to accept a position with the Pittsburgh & Lake Erie, with headquarters at Pittsburgh.

—Mr. F. M. Bisbee has been appointed Superintendent of Tracks, Bridges and Buildings for the St. Louis & San Francisco, with headquarters at Springfield. Mr. Bisbee has held a similar position with the Gulf, Colorado & Santa Fe.

—Mr. A. J. Richter, with the Pennsylvania passenger department at Cincinnati, has been appointed District Passenger Agent of the Columbus, Hocking Valley & Toledo Road, with headquarters at Toledo, O. He succeeds Mr. H. A. Wilson.

—Mr. Frank J. Sarnan has been appointed to succeed George C. Mills as Superintendent of the Manitou Beach road. Mr. Sarnan has been Master Mechanic on the road for several years. Charles Sarnan, his brother, has been given the position of Master Mechanic. They both assumed their duties on Aug. 20.

—Mr. Sylvester T. Smith, recently elected President of the Florence & Cripple Creek road, has been for the past six months practically at the head of the company. Mr. Johnson, his predecessor, having been absent in Europe during that time. Mr. Smith was formerly General Manager of the Denver & Rio Grande.

—Mr. E. McNeil has been elected President of the new Oregon Railway & Navigation Co., which has just formally taken possession of the lines of the old Oregon Railway & Navigation Co. Mr. McNeil has long been General Manager of these lines and will continue in that office. Recently he has been Receiver of the old company.

—Mr. Stephen D. Kennedy, Maryland Passenger Agent of the Pennsylvania, died at Atlantic City, N. J., last week. Mr. Kennedy was born in Simcoe, Ont., in 1849. He had been connected with the Pennsylvania for 20 years. Prior thereto he was North Carolina Agent of the Richmond & Danville and Virginia representative of the Baltimore & Ohio, with headquarters at Richmond. For several years he was located at Newark, N. J., and Long Branch, in charge of the seashore business of the Pennsylvania.

—Mr. John Lightner, who died at Jamaica Plains, Boston, Aug. 17, held many important railroad positions during his active business life. His first railroad work was probably on the Baltimore & Ohio in the car department of that company at Baltimore. Later on he went to Boston with the Boston & Providence road, and he was an officer of that company from 1834 until 1888, most of that time as Master Car Builder. He leaves three daughters, one of whom is the wife of General Harnden, of Wisconsin.

—Mr. C. H. Prescott, Second Vice-President of the Northern Pacific, with office at Tacoma, has resigned and will not be connected with the new company. Since the Receivers were appointed Mr. Prescott has acted as Pacific Coast Agent. He has been connected with the Northern Pacific since 1888 and was previously an officer of the Oregon & Trans-Continental and Oregon Improvement companies. Of the latter he was at one time President and Manager and he also held the latter office for a time on the Oregon Railway & Navigation Co. He first went to Portland as Comptroller of the latter corporation.

—Mr. G. W. Dickinson, now General Manager of the Western lines of the Northern Pacific, having jurisdiction on that portion of which Mr. Burleigh is Receiver, has resigned and will retire on Sept. 1. This is one of the changes consequent upon the transfer of the property from the Receivers of the new company, but it is stated that the retirement of Mr. Dickinson is entirely voluntary. He was formerly Assistant General Superintendent, with office at Tacoma, and was made General Manager to the Receiver of the Western lines soon after Mr. Burleigh was appointed to that office. He became Superintendent of the Northern Pacific in 1889 and previously held similar offices on the Montana Union and Union Pacific roads.

—The offices of Purchasing Agent of the St. Louis & San Francisco, and Superintendent at Fort Smith, Ark., held by J. A. Mantor, and that at Salem, Mo., held by E. B. Sankey, have been done away with. The road hereafter will be operated as two divisions. Mr. J. A. Mantor will remain with the company as Superintendent, with headquarters at Springfield, Mo., succeeding Superintendent L. D. Button, retired, and will have jurisdiction from St. Louis to Paris, Tex., and over the Salem, Bolivar, Chadwick, St. Paul and Mansfield branches. Mr. A. O'Hara will be Superintendent of the

Kansas Division, with office at Neodesha, Kan., with jurisdiction west of Monett to Sapulpa, I. T., Pierce City to Ellsworth and Girard. Weir and Anthony branches. The position held by Mr. E. B. Sankey, as Superintendent of the Salem branch, has been abolished. The office of the General Superintendent has also been abolished, and Mr. J. R. Wentworth, who has held that position, appointed Superintendent of Transportation, in charge of transportation department.

—Mr. Max J. Becker, Consulting Engineer and Real Estate Agent of the Pennsylvania Lines west of Pittsburgh, died on Sunday last at Mackinac Island, where he had gone just one week previous for rest. He had been in failing health for over a year. Mr. Becker was born in Germany 68 years ago. He received a college education and went into railroad service in 1848 as an engineer's apprentice on the Cologne & Minden Railroad. He was one of the many educated and high-minded Germans who came to this country in the fifties on account of the political troubles in Germany. Mr. Becker coming over with Carl Schurz. He obtained a position as draftsman on a railroad in Indiana, but soon became Resident Engineer in charge of construction of the Steubenville & Indiana road. He was afterward an engineer in the Public Works Department of Ohio, but about 1860 became Resident Engineer of the Marietta & Cincinnati road. In 1863 he had charge of the building of the Ohio River bridge at Steubenville. About 1867 he went to Pittsburgh, and became Chief Engineer of the Pennsylvania lines. A year or two ago he was made Consulting Engineer and Real Estate Agent.

—Mr. Job Abbott died at Andover, Mass., on Aug. 18 aged 57 years. His illness having been contracted over a year ago while on railroad work in Maine, and in April last became so serious that he was compelled to give up all work and close his consulting engineer's office in New York City, going to his home in Andover. Mr. Abbott's chief work had been connected with bridge designing and constructing. Early in his professional career he had been connected with several railroads and then became specially interested in patent law. This brought him into relations with the Wrought Iron Bridge Co. at Canton, O., with which he soon became identified, and was a director until his death. Believing that a bridge building works in Canada could be made profitable he organized the Toronto Bridge Co. in 1878. In 1882 he organized the Dominion Bridge Co., of Montreal, which has built some of the heaviest bridges in Canada, notably the Lachine Bridge for the Canadian Pacific over the St. Lawrence River. In 1888 he became Consulting Engineer to the Wheeling Bridge & Terminal Railway, at Wheeling, W. Va., and built the Ohio River bridge of that company and its terminal tracks and buildings. Since 1889 he has had an office in New York City as Consulting Engineer. For the last few years he has been Consulting Engineer of the Bangor & Aroostook road in Maine.

—Mr. H. M. Littell was last week elected a director and Vice-President of the Metropolitan Street Railway Co. of New York City, and was subsequently made General Manager of the company. Holding these offices he will occupy a trying and responsible position in the direct operation of nearly 185 miles of street railroad track operated by cable, horses and electricity and including lines having, without doubt, the heaviest traffic and extending through the most crowded city streets of any street railroad now operated. Mr. Littell, however, has had a valuable experience in street railroad operation extending over nearly 20 years, although he is now only in the prime of life. He was General Manager of the St. Paul City Railway in 1883, but two years later became General Freight and Passenger Agent of what is now the Chicago, St. Paul & Kansas City road. In 1888 he went to Cincinnati as General Manager of the Cincinnati Inclined Railway and in 1893 was appointed President and General Manager of the New Orleans Traction Co. While holding that position he rebuilt all the lines of the company—about 110 miles—substituting electricity as the motive power, and building 20 miles of new track. His work here brought him into a good deal of prominence and in 1895 he was appointed President and General Manager of the Atlantic Avenue Electric Road in Brooklyn, N. Y. Last June the Atlantic Avenue line was absorbed by another Brooklyn company and Mr. Littell resigned the offices he held.

ELECTIONS AND APPOINTMENTS.

Chicago, Iowa & Minnesota.—Hon. E. S. Ellsworth, of Iowa Falls, Minn., has been re-elected President of the company. The other officers of the company elected at the last meeting of the stockholders are: Vice-President, A. L. Chester; Treasurer, J. M. Pendleton, Jr.; Assistant Treasurer, T. J. Birdsall; Secretary, M. J. Furry. The company was organized to build an extension of the Chicago, Iowa & Dakota.

Georgia & Alabama.—At called meetings of the stockholders of the two companies resolutions were passed by which the Abbeville & Way Cross Railroad, extending from Abbeville to Fitzgerald, Ga., 22 miles, has been merged with the Georgia & Alabama, and will hereafter be known as its Fitzgerald branch. The mileage of the road is thus increased to a total of 362 miles.

Marshall, Timpson & Sabine.—The incorporators of this new Texas company are: L. F. Limbert, of Greenville, O.; Ray Russell, of Kokomo, Ind.; J. L. Garrison, of Nacogdoches, Tex.; T. S. Garrison, B. F. Harbaster, C. E. Sanford, Sol Burkett, W. T. Avery, W. F. Fouché and A. L. Vinson, all of Timpson, Tex.

Muskogee, Oklahoma & Western.—The stockholders of the company have elected officers as follows: P. J. Byrne, President; L. Morphis, First Vice-President; G. W. Sutton, Treasurer; B. W. Morphis, Secretary and Attorney. Directors—J. S. Stapler, Tablequah; C. W. Turner, P. J. Byrne, P. Porter, A. W. Robb, Muskogee; C. W. Sutton, W. H. Herbert, R. W. Dunlap, J. L. Morphis, Cleveland; C. E. Vandervoort, F. M. Thompson, B. W. Morphis, Pawnee. Executive Board—P. J. Byrne, C. W. Turner, P. Porter and W. H. Herbert.

Northern Alabama.—Mr. C. H. Goodrich having resigned to accept service elsewhere, Mr. N. R. Adriance has been appointed Superintendent and Traffic Manager, with headquarters at Sheffield, Ala.

Northern Pacific.—Receivers Henry Bigelow and Burleigh made their final report on Aug. 22, and President Winter announced the following as officers to assume charge of the road on Sept. 1: E. H. McHenry, Chief Engineer; Charles S. Cooney, of New York, Secretary; George H. Earl, of St. Paul, Assistant Secretary; Albert E. Little, of New York, Treasurer; J. W. Kend-

rick, of St. Paul, General Manager; J. M. Hanna, of St. Paul, General Traffic Manager; Francis L. Stetson, of New York, and Charles W. Bunn, of St. Paul, General Counsel; William H. Phipps, St. Paul, Land Commissioner; and W. G. Pearce, General Superintendent. Mr. Pearce will have jurisdiction over lines west of Billings, Mont., with headquarters at Tacoma, Wash. Charles S. Fee will remain at the head of the passenger department, and S. L. Morse will continue in the position of General Freight Agent. No Vice-President has been appointed.

Oregon Railroad and Navigation Co.—The executive officers of the new company are: President, E. McNeill; Secretary and General Attorney, W. W. Cotton; General Auditor, E. S. Benson, and Treasurer, G. E. Withington.

St. Louis & San Francisco.—Some important changes have been made by the new management in the organization of the operating department. The office of General Superintendent has been abolished. The Division Superintendent's office at Fort Smith, and the St. Louis and Texas divisions, including Salem branch, have been consolidated under the Division Superintendent's office at Springfield. Mr. J. R. Wentworth, formerly General Superintendent, is appointed Superintendent of Transportation, in charge of the Transportation Department. Division Superintendents will report to and receive their instructions from him. Until further advised, roadmasters, bridgemen and others, heretofore reporting to the General Superintendent, will report direct to Vice-President and General Manager Yoakum. Mr. Wentworth as Superintendent of Transportation announces the organization of the transportation department as follows: St. Louis Division—J. A. Mantor, Division Superintendent, Springfield, will include the line St. Louis to Paris, Salem branch, Bolivar branch, Chadwick branch, St. Paul branch, Mansfield branch. Kansas Division—A. O'Hara, Division Superintendent, Neodesha, Kan., will include the line west of Monett to Sapulpa. Peirce City to Ellsworth. Joplin branch, Girard branch, Weir branch, Anthony branch. Under the foregoing rearrangement Messrs. Button and Sankey, Division Superintendents, retire. Mr. E. T. Smith, Purchasing Agent, as heretofore announced, has resigned and his office has been abolished. General Manager Yoakum will in future look after the purchasing department.

San Diego, Pacific & Eastern.—At a meeting of the stockholders of the company, held in San Diego, Cal., recently, the following Directors were elected: George W. Vrooman, of North Platte, Neb.; William P. Daniels, of Denver; F. E. Gilleland, of Omaha; R. S. Thomas, of Los Angeles; C. R. Stewart, J. R. Stearns, Joseph Bachman and J. M. Dodge, of San Diego. The board organized with George W. Vrooman, President; William P. Daniels, Vice-President; C. R. Stewart, General Manager, and J. M. Dodge, Secretary.

RAILROAD CONSTRUCTION.
Incorporations, Surveys, Etc.

Central of New Jersey.—The company has now under construction a piece of track running from the Canal Branch of the Lehigh & Susquehanna Division to Port Blanchard, Pa., and connecting there with the Erie & Wyoming Valley road. The new track is to be nearly two miles in length and will open up a new field for coal and freight traffic between the two roads, giving the Central of New Jersey a better delivery in Pittston than it now has. It will also put in use about four miles of track comprising the Canal Branch, which has been practically out of service for the past 10 years owing to the coal mines along that branch having been exhausted.

The contract for grading, masonry, etc., has been awarded to Burke Brothers, of Scranton, Pa.

Charleston & Macon.—Chief Engineer Swantz states that two locating parties are now out in the first division from Charleston to Allendale, S. C., buying rights of way, as they go, etc., and that actual work of construction will begin early in September. Once begun it will be rapidly pushed to completion, as the contractors, W. B. Strong & Co., 15 Wall street, New York, are bonded to complete the first division in a given time.

Chicago, Hammond & Western.—The first train over this new road was run Aug. 12. This is the new belt railroad built and operated by the G. H. Hammond Packing Company, and extends from Lake Michigan to Blue Island, Ill. It connects with all the trunk lines running into Chicago from the south and east. President J. P. Lyman, General Manager of the Hammond Company, which owns the line, says the extension to Stickney will be completed as rapidly as possible.

East Tintic.—This road is being built to connect the town of Mammoth, Utah, with the mine of that name, a distance of two miles, and it is expected that it will be completed within a few weeks. Mr. S. N. Hornbuckle is Superintendent of Construction. The new line will connect at Mammoth with the Union Pacific, Denver & Gulf.

Erie.—The Council of Rutherford, N. J., on Aug. 21 passed an ordinance granting the right to the Erie to build two additional tracks through the town. In return, the road has agreed to build a new passenger station, to cost at least \$10,000, at Rutherford.

Gulf & Ship Island.—The rebuilding and new construction work on this road, in Southern Mississippi, is now about closed up. The present length of the road is 71 miles, which has all been laid with rails since Jan. 1, about 45 miles of it between Jan. 1 and July 1, as already stated in these columns, the balance since July 1. Twenty miles of the track was laid with rails about eight years ago. It was used a little and then abandoned, and when the present owners took hold of it in October of 1895 it was merely strung along and overgrown with bushes. The track laid is between the Gulf Coast, at Gulfport, Miss., and Hattiesburg, Miss. The rail is a 60-lb. section, except the 20 miles, which is laid with 56-lb. rails. The work done this year has been by the Bradford Construction Co., of which S. S. Bullis is General Manager. T. J. Stewart is Receiver of the railroad. Col. W. W. Hungerford is Chief Engineer in charge of the work now being done.

Hamilton, Grimsby & Beamsville.—Messrs. Carpenter & Ramsay, of Hamilton, Ont., have been given the contract for supplying the rails and track material for the extension from Grimsby to Beamsville, Ont., The amount of the contract is above \$30,000.

Hants Central.—The contract between this company and the Dominion Government for the construction of a railroad between Truro and Windsor, N. S., has been signed.

Marshall, Timpson & Sabine Pass.—This company has filed a charter with the Secretary of State in Texas

with a capital stock of \$20,000. The incorporators are L. F. Limbert, of Greenville, O.; Roy Russell, of Kokomo, Ind.; J. L. Garrison, of Nacogdoches, Tex.; T. S. Garrison, B. F. Harbuster, C. E. Lanford, S. Burkett, W. F. Avery, W. F. Fouché and A. L. Vinson, all of Timpson, Tex. The corporation proposes to construct a road, to begin at Timpson, in Shelby County, and running thence in a northerly direction through Shelby and Paola counties, a distance of about 20 miles.

Mexican Central.—The Lerdo extension of 30 kilometers through the cotton district is now pretty well graded, and about 5 or 6 kilometers are laid. This line is expected to be finished by Oct. 1. About 40 kilometers out of 87 are laid on the Ameca extension, and this work is also expected to be finished Oct. 1.

Minneapolis, St. Paul & Ashland.—Grading is now nearly all completed as far as Pike Junction, Wis., on the Duluth, South Shore & Atlantic. The complete survey through to St. Croix Falls, Wis., has been completed. Track-laying will soon be begun from Ashland. The subject of terminals in Ashland has not yet been definitely decided upon.

Mississippi & Lafourche.—Five miles of this line in Louisiana along Bayou Lafourche will be opened for traffic on Sept. 15. The road is projected to extend from a point on the west bank of the Mississippi River in a southwesterly direction for 40 miles, following Bayou Lafourche this distance. The river terminal is at Lauderdale, a point 70 miles north of New Orleans, where a connection is secured with all river traffic, as well as with the Yazoo & Mississippi Valley branch of the Illinois Central, on the east bank of the river just opposite Lauderdale. One mile from the river the new line will intersect the Texas & Pacific. The Southern terminal is at Lafourche crossing connecting with the Southern Pacific. The route is through the towns of Paincourtville, Platonville, Napoleonville, Labadieville and Thibodeaux, reaching all of the large sugar refineries on Bayou Lafourche. The company does the construction work with its own forces. All surveys have been made and the right of way secured. There are two bridges to be built, each one consisting only of one drawspan 220 ft. long, which will be contracted for. R. W. Edwards, of Lauderdale, La., is President.

Missouri Central.—The incorporation of the company in Missouri was noted in these columns a few weeks ago. The following information concerning the line has been obtained: The projectors have in view the opening up to settlement of the hitherto unoccupied territory in Central Missouri, Arkansas and Louisiana. It is proposed to form a direct line between the "Twin Cities" at the north with the deep water on the Gulf. The plans are not yet matured fully, hence nothing can be definitely said as to route and time of construction. The section of line between Versailles, Mo., and Little Rock, Ark., will be the first constructed, and it is expected will pass through Lebanon, Hartsville, Mansfield, Ava and Gainesville, Mo., and Mountain Home, Mt. View, Heber and El Paso, Ark. Mr. Jas. Donohue, formerly General Freight and General Passenger Agent of the Kansas City, Pittsburgh & Gulf road at Kansas City, is Vice-President and General Manager of the Construction Company, with office in Kansas City, and Mr. E. Underwood is Chief Engineer, located at Chicago. A. Stevenson, 209 Adams street, Chicago, is Secretary of the Railroad and Construction Co.

Montana.—The contract for the track-laying on this road has been given to A. B. Cook, of Missoula, Mont., and Martin Woldson, of Castle. The contract calls for the completion of the work by Nov. 15. The line, when completed, will be 40 miles long, and will connect the mining districts of Castle, Mont., with Helena.

New York & Pennsylvania.—It is expected that this road will be completed to Canisteo, N. Y., within a short time. The road will then extend from Oswayo, Pa., north to Canisteo, passing through Genesee Forks, Pa., and Rexville, N. Y., a total distance of 42 miles. Rails are now laid from Oswayo, to a point about one mile north of Rexville, and grading has been finished to within eight miles of Canisteo. At Canisteo the company will connect with Hornellsville by means of the Erie tracks.

Norfolk, Willoughby Spit & Old Point.—The track-laying from Ocean View (near Norfolk) to Willoughby Spit was completed last Saturday, and the first train over the new road was run the first of the present week. At present steam is used, but it is the intention to make the road an electric road. A ferry will be run to Old Point. The new road gives a direct connection between Norfolk and the Atlantic coast hotels.

Pennsylvania.—The reports in regard to the action of the company in carrying out its policy of stopping new construction work have said that the work on the new line at Mount Joy would be the only improvement not effected by these orders to suspend new work. From other more recent statements, apparently authoritative, the new line to Mount Joy, the new line to Duncannon on the Middle Division; the new work from Lilly's to Portage, on the Pittsburgh Division, and the new tunnel through the hill at Rodebaugh, on the Pittsburgh Division, will be continued as at present. These improvements were placed under contract in December last.

Pennsylvania Co.—The work of building the new second track between Columbus and Pittsburgh is still going on, and the work is being pushed on the new Union station at the former place as rapidly as possible. It is the intention to build a freight station at Indianapolis as soon as the company can get possession of the property. Some of the leases do not expire until the first of the year. A number of the officials were in Indianapolis last week to consult with the city officers, particularly in regard to the petition for a permit to put five additional tracks across Pennsylvania street, so as to reach the proposed freight house. The city has not yet granted the request.

Philadelphia & Reading.—Engineers of the company are at work round about Shamokin and Sunbury, Pa., taking levels with the view of reducing some of the heavy grades in those vicinities and obviating the necessity of having an extra engine to help the heavy trains over that part of the line. This work that has given rise to reports in the newspapers of a project to tunnel Broad Mountain. This idea goes as far back as 1888, when engineers in the service of the Reading Company ran a direct line from near Wadesville to a point about a mile beyond Shamokin. Since then several other routes have been surveyed, but the project never went any further. The building of a tunnel is not contemplated, as the reduction of some of the heavy grades on what is known as the Tamaqua line would give ample facility for the quick transportation of coal from the Shamokin and other regions.

Pontiac & Pacific Junction.—Mr. H. J. Beemer, President of the company, expects that work will be

commenced about Sept. 15, on the extension of the line from Aylmer, to Hull, Que.

San Francisco & San Joaquin Valley.—The first through train between Stockton and Fresno, Cal., was run over this road on Aug. 15. Track-laying is now practically completed to a point just north of the city, which will remain the terminus until the right of way is secured through the city streets.

Sherman & Patten.—Track-laying was completed on this road on Aug. 19 and the building of stations and other necessary buildings will begin at once. The road is six miles long and connects the town of Patten, Me., with the Bangor & Aroostook. The running of regular trains is expected in a few days.

Southern Pacific.—The recent improvements on the Atlantic lines, and the work of improvement now going on, was recently summarized by a general officer, in an interview in a local newspaper, about as follows: Extended improvements have been made at Algiers, La., opposite New Orleans, where a new ferry incline has been built to facilitate transfer of cars over the river and shortening the distance across. Moreover, at Algiers a viaduct 1,800 ft. long, of steel, with cement flooring, to carry the city traffic over the Southern Pacific tracks, has been built at a cost of \$25,000. The company is completing 25 miles of second track between Bayou Salle and Oliver, both tracks being gravel ballasted. The gravel is selected and hauled 400 miles from Rapids Parish, on the Red River, near Alexandria. Within the last 12 months four miles of double track have been built east of Houston to Englewood yards, which have been laid out for facilitating interchange of traffic with other roads. Fifteen miles of new 75-lb. rails are being laid between Houston and Weimer and Glidin, replacing the old 50-lb. rails. Seven miles of 75-lb. rails are replacing the 61½-lb. rails in Louisiana near Green's Bayou, and 6½ miles of the heavy rails are replacing the 50-lb. rails from Houston west to Stella.

The El Paso division has been ballasted for 16 miles between Sanderson and Longfellow with heavy gravel from the Sanderson pit, and 60 miles of 75-lb. rails are replacing the 50-lb. rails hitherto used. Nearly 20 miles are now laid. The roadbed between Fabians and El Paso is being raised to give the local acacias more room and keep the bed drier.

As to the Pacific system, the work of closing up the short gap near Marguerite on the Coast division, is progressing favorably, though slowly, owing to the extent of heavy rock cutting to be done. When this connection is made, the route through the San Joaquin valley will be abandoned, and through passengers carried along the Pacific Ocean shore. The change will also be advantageous to the railroad company in that the present heavy grades will be avoided, including the heavy climb over the range. A large amount of rails have been sent west this spring for the Arizona and California divisions, in place of the lighter rails. The right of way has been straightened and shortened in many places, curves taken out, new ditches dug to turn aside floods, cuts lowered fills widened, heavy ballasting has been done, and a general work of improvement done. During the summer 1,000 extra men have been busy on the present line.

South St. Paul Belt Line.—The Belt line bridge and tracks connecting the Union Stock Yards with the Chicago, Burlington & Quincy and Chicago, Milwaukee & St. Paul roads, at St. Paul, will be operated within 10 days. President M. D. Flower, of the Union Stock Yards, said that an amicable arrangement has been made between the Union Stock Yards Company, the Belt Line road and the two railroads named, to operate the road. The road has been completed for nearly two years, but has never been used before. Live stock billed to the yards from river points south will save considerable time by coming through Newport over the bridge, and Western cattle especially, going last over the two roads mentioned, will save time by going directly East and South from the yards without delay.

Texas Midland.—Commencing Sept. 1, the new line north of Greenville will be open for freight and passenger traffic to Cooper, 30 miles. There is one intermediate station, Commerce, Hunt County, Tex., 14.6 miles from Greenville.

Union Pacific, Denver & Gulf.—The Receiver has rebuilt that portion of the Colorado Central which was washed away in a cloudburst on July 24. Nearly seven miles of track were practically destroyed, and the work of re-building had involved the construction of an entirely new roadbed on a new location on the side of the mountain for this distance between Golden and Beaver Brook. Nearly 800 men have been working steadily since July 25 under General Superintendent Dunaway, and the first through train on the Colorado Central from Georgetown and Central City into Denver was run on August 14. The Colorado Central is the line on which the well-known Georgetown lap is located.

Washington County.—Mr. D. McQueen, contractor of St. John, N. B., has received the contract for a section of this line in Maine, of which Mr. James Mitchell, of Portland, Me., is the chief contractor.

Electric Railroad Construction.

Allegheny, Pa.—The 10 separate ordinances, referred to among our construction notes last week, provide for street-car lines along the streets immediately adjacent to the Allegheny River, and out the East street valley to Perrysville avenue at the city line and the Evergreen plank road. A spur along the river front to Herr's Island will complete the designs of the capitalists to the east. To the west the line which parallels the Manchester system, branches off through the thickly settled First Ward, forming important loops, and will branch off to the northwest on the trail of the Manchester road. It goes to the city line and will complete the loop with the roads out of Perrysville avenue.

Baltimore, Md.—The extension of the Black River line of the Baltimore, Middle River & Sparrows Point road, has been completed to Baltimore street, in the rear of Patterson Park, and the line is now in full service over the entire route. In September the company expects to have completed the 1,300-ft. bridge over Black River, which will complete the extension of the road to Middle River.

Bristol, Pa.—Work has recently been begun on an extension of the Bristol & Langhorne electric road, from Langhorne to Bristol, about six miles. The line will pass through the boroughs of Langhorne Manor and Hulmeville, entering Bristol by the Bath road. G. S. W. Brubaker has the contract for the work.

Carlisle, Pa.—On the extension of the Harrisburg & Mechanicsburg electric road, which is being built between this place and Boiling Springs, about one-half of the work has already been completed. The total distance between the two places is six miles.

Chicago, Ill.—The West Side Street Car Co. is building a new line on Fifth avenue, between Twelfth and Van Buren streets.

The new car-house of the Chicago City Railway Co. will be erected on the site of the car house which was destroyed by fire on July 18. The estimated cost is \$75,000. It is to be 243 ft. x 642 ft. and will have a capacity for 450 cars.

Cleveland, O.—Work on the Lorain & Cleveland Electric road will be begun this fall, and it is expected that the road will be finished by next summer. The line will be 20 miles long. The officers of the company are as follows: President, B. Mahler; Vice-President, E. G. Tillotson; Treasurer, E. W. Moore; Secretary, Jas. B. Hoge; Assistant Secretary, F. W. Coen; Purchasing Agent, C. W. Wason.

The Cleveland, Painesville and Eastern road has filed a trust deed for \$500,000, in favor of the Cleveland Trust Co. and the State Trust Co. of New York.

Franklin, Mass.—The Medway & Franklin Street Railway Co. has been organized, to build an electric railroad to connect the villages of North Bellingham, Caryville, Medway Village, West Medway, Franklin and Wrentham, a total distance of 16 miles. Estimated cost, \$40,000.

Frederick, Md.—Regular cars began to run over the Frederick & Middletown Electric Railroad from Frederick to Braddocks Heights last week. Work on the new road was begun in June. When completed it will be eight miles long. The power is furnished by the Frederick incandescent light plant.

Hamburg, N. Y.—The Buffalo, Orchard Heights & Hamburg Electric Railway Co. has been organized by W. W. Wheatly, of New York, A. W. Hickman and others, to build an electric road from Buffalo to Hamburg. Capital stock, \$120,000.

Hamilton, Ont.—The Hamilton, Chechoke & Ancaster Electric Railway Co. proposes to build an electric road from Green street and Herkimer avenue, in Hamilton, to Ancaster, via Beckett Mountain, about four miles, at an estimated cost of \$10,000 per mile.

Hyattsville, Md.—Work on the Columbia & Maryland electric road is being pushed rapidly, and four miles of track have been entirely completed between Lakeland and Hyattsville. The road is double track. Work on the power-house at Lakeland has begun, the walls and stack having been completed. All the grading has been completed between Washington and Laurel.

Ironton, O.—It is stated that the Ironton Electric Light & Street Railway Co. will be incorporated with a capital stock of \$200,000. R. T. McDonald, E. J. Hawthorne and others, of Ironton, are interested.

Irwin, Pa.—The route for the extension of the Greensburg, Jeanette & Pittsburgh electric line from Irwin to Pittsburgh has been selected. The line will follow the township road through the Irwin, White, Kendig and Robinson farms, and will connect with the Versailles avenue line near McKeesport. Work between Penn station and Manor is being pushed, and it is the intention of the company to have the entire line completed before winter.

Marietta, O.—Surveys have been completed, and work will be commenced at once on the Marietta Electric Street Railway. The road will be entirely within the city limits and will be built by local capital. All of the grading and track laying will be done by the company, and the contracts for machinery and track material will be let within a few days. The power-house equipment will consist of two dynamos, one of 500 volts, and the other of 2,000 volts. A. L. Gracey is President of the company, J. S. H. Torner, Secretary, and R. J. M. Danley, Superintendent.

Monroe, Mich.—The Toledo, Monroe & Detroit Traction Co. has been incorporated by R. B. Thomas, J. A. Dawson, W. G. Gardner, J. A. Stewart, W. L. Hoyt and Attorney Charles G. Watson, of Toledo, to build a road between Toledo and Detroit.

Montclair, N. J.—The North Jersey Traction Co. has its line in operation from Caldwell to the Montclair line on the west, and from Bloomfield through Glen Ridge to Montclair on the east, but cannot secure the right to pass through Montclair, because of the attitude of the Montclair Council.

Montreal, Que.—An electric road is being built to connect the east end of the Island of Montreal with the lines of the Montreal Street Railway Co. by the Chateaugay & Northern Railway Co. The cars are now being built at Peterboro, Ont. The power-house, which has been located at Point aux Trembles, will be 85 ft. long, 46 ft. wide and contain four Goldie & McCullough engines. The total length of the road will be 13 miles.

The Montreal Park & Incline Railway Co. is preparing plans for the construction of two new power-houses to take the place of the one recently destroyed by fire. One will be erected at Lachine and the other at St. Laurent. The extension of the line to each of these places is progressing rapidly, and it is expected that the power-houses will be completed by fall. New cars have also been ordered.

New Brighton, N. Y.—The Richmond Borough Electric Co., of New Brighton, Staten Island, was incorporated on Aug. 24, to operate in New Brighton, Edgewater, Port Richmond and other towns in Richmond County. The capital is \$400,000, and the directors are: Albert E. Leon, of Boston; Henry Dun Wiman and Daniel Campbell, of West New Brighton; William L. Douglass and John J. Whipple, of Brockton; and William A. Clark, Jr., and William B. Littlefield, of Lynn.

Ottawa, Ont.—It is proposed to build an electric road between Ottawa and Richmond, a distance of about 20 miles.

Racine, Wis.—Work on the Milwaukee, Racine & Kenosha Street Railway was begun on Aug. 24, and it is expected to be completed and the road in operation by Nov. 15. The officers of the company are Matthew Slush, President; A. W. Bishop, Vice-President and Treasurer, and T. M. Kearney, Secretary.

Uniontown, Pa.—The Uniontown Electric Railway Co. will extend its road to Fairchance, a distance of six miles. It is stated that the new line will be open by the middle of October.

Ypsilanti, Mich.—The Ann Arbor & Ypsilanti Street Railway Co. has been granted a franchise by the Ypsilanti and Pittsfield town boards, to use electric power.

GENERAL RAILROAD NEWS.

Boston & Maine.—The results of operations for the year are given below, with comparisons for the previous year:

	1895.	1896.	Inc. or dec.
Gross earn.....	\$16,892,314	\$20,460,092	I. \$3,567,778
Oper. exp.....	11,752,450	14,507,183	I. 2,754,735
Net earn.....	\$5,139,855	\$5,952,909	I. \$813,053
Misc. income.....	565,684	614,452	I. 48,768
Total net income.....	\$5,705,540	\$6,567,361	I. \$861,821
Interest, rentals & taxes..	4,326,509	5,219,259	I. 892,750
Surplus.....	\$1,379,031	\$1,378,102	D. \$928
Sinking fund payments..	72,750	72,632	D. 117
Bal. for dividends.....	\$1,306,281	\$1,305,470	D. \$811
Dividends (6 p. c. on com. and pref. stock).....	1,231,997	1,234,002	I. 4,500
Balance.....	\$72,283	\$71,467	D. \$816.24

The figures for 1894-5 do not include operations of the Concord & Montreal Railroad. The gross income for the year 1896, compared with the combined gross of the Boston & Maine and Concord & Montreal roads, operated separately, for the previous year increased \$1,140,987 and the operating expenses increased \$967,427. This year's operating expenses include, among other large charges for permanent improvements, \$408,940 for new equipment, and \$573,477 for automatic couplers and brakes applied to freight cars and engines. The increase in the amount expended for these two items over corresponding charges to operating expenses last year is \$382,081.

Buffalo, Rochester & Pittsburgh.—The report to the New York Railroad Commission gives the following comparative results for the year to June 30:

	1895.	1896.	Inc. or dec.
Gross earn.....	\$3,024,072	\$3,027,378	D. \$3,306
Oper. expen.....	2,120,161	2,172,430	D. 52,269
Net earn.....	\$893,911	\$854,947	D. \$38,964
Other income.....	37,889	39,662	D. 1,773
Total income.....	\$931,799	\$894,609	D. \$37,190
Charges.....	824,156	851,339	D. 27,183
Surplus.....	\$117,644	\$43,271	D. \$74,373

Grand Trunk.—The following is the summary of results of the accounts for the half-year to June 30:

	1895.	1896.	Inc.
Gross receipts.....	\$1,707,510	\$1,653,100	\$54,500
Working expenses.....	1,218,200	1,171,100	\$47,200
Ratio of expenses.....	71.35	70.81
Net revenue.....	\$489,300	\$482,000	\$7,300
Net charges.....	484,700	478,100	\$6,600
Balance.....	\$4,600	\$3,900	\$700

The company in 1895 had to borrow an additional \$150,000 to meet interest charges on its own and its subsidiary lines. There has, consequently, been an increase in fixed charges for the half year of \$6,600, and the balance of net revenue over the fixed charges on the main line for the half year amounts to \$4,600, as against \$3,900 for the first half of 1895, the Chicago & Grand Trunk showing a deficit to be met by the Grand Trunk of \$54,000, as compared with \$67,900 in the first half of 1895. The total deficiency on the Chicago & Grand Trunk appears to have been \$60,000, as against \$75,100 in the first half of 1895. The deficiency of the Detroit, Grand Haven & Milwaukee for the half year has amounted to \$32,000, in contrast with \$30,200 for the June half of last year. The net result, therefore, of the working of the combined system has been a deficiency for the half year of about \$88,000 in contrast with a deficiency for the first half of 1895 of \$101,200.

Louisville, New Albany & Chicago.—Judge W. A. Woods, in the United States Circuit Court, at Indianapolis, on Aug. 24, appointed William H. McDoel, Receiver of the company, upon the application of John T. Mills, Jr., of New York City. Mr. McDoel is the General Manager of the road. The receivership has been anticipated. President Thomas announced about ten days ago that the decision of the United States Court, recently announced in what is known as the Beattyville bond case, would produce such a result. In October, 1890, the management then in control leased the Richmond, Nicholasville, Irvine & Beattyville road, then under construction from Nicholasville to Lee County, Ky., guaranteeing the principal and interest of its bonds. This road went into a receiver's hands on Dec. 2, 1891, and has only recently been organized as the Beattyville & Cumberland Gap road. The present management of the Louisville, New Albany & Chicago has refused to carry out the guarantee of the bonds because it asserted that the guarantee had been illegally procured. In September, 1894, a decision sustaining this contention was obtained, which was reversed about a fortnight ago upon appeal.

President Thomas issued the following statement after the receivership was announced: "The tactics of the litigants in the Beattyville bond suit have compelled the officers of the company to ask the protection of the court by the appointment of a receiver. Attachments were being served upon its money and its equipment in various states, which threatened to prevent the operation of the road. This action is taken in the interest of the present security holders, and will maintain the property intact until such time as a reorganization can be arranged. Mr. McDoel, the Receiver, has been the General Manager of the company and is well fitted to care for the property. The present receivership, forced upon the Monon, is an extraordinary example, in view of the fact that the railway company has always been abundantly able to pay all of its debts and to earn the interest upon all of its obligations. Its solvency has never been questioned until the judicial decision of Judge Taft opened the way to saddle the Monon Company with the debts of another road. It is to-day in better condition physically than ever before and its capacity for earning money is better. A majority of the mortgage bonds of the company are in the hands of friends of the company and it will be easy to arrange for a foreclosure which will extinguish the alleged claims in connection with the Beattyville suit and will enable the property to be restored to those at present interested in it, without the sacrifice of any part of their existing values. The company has only a trifling amount of bills payable, which were created for the purpose of building the Indianapolis terminals and the Lafayette shops, both of which are vested in separate corporations and secure the debt in the interest of the Monon Company. Full value exists in the property to cover the face of every bond which the Monon owes and leave a large surplus of value and of earning capacity to be ultimately made available for the stockholders."

The company's main lines extend from New Albany, opposite Louisville, to Michigan City, and from State Line to Indianapolis. There are 537 miles in the system, which is known as the "Monon." Gen. Samuel Thomas has

been the President of the company since March 30, 1891, succeeding William L. Breyfogle, who served only during the previous year. The company has a share capital of \$15,250,000, of which \$6,250,000 is preferred, and \$10,000,000 of its bonds of various issues are listed on the New York Stock Exchange.

Macon & Atlantic.—This road was offered at public sale by the Receiver at Swainsboro, Ga., on Aug. 15, but no bid was made for the property. The minimum price fixed by order of court was \$210,400. Some of the rolling stock of the road, however, was sold. Forty-seven box cars sold at \$126 each, or a total of \$5,922; 24 flat cars sold at \$87 each, or a total of \$2,088; total sale of cars, \$8,010. The cars were bought by the Wrightville & Tenuille road in Georgia. The property consists of about 30 miles of graded road east of Bruton, Ga., near Macon, and a right of way to the coast, with some land near Savannah.

Monterey & Mexican Gulf.—J. A. Robertson, formerly Receiver and General Manager of the road, has instituted suit against the Belgian bondholders, who are now operating the property for \$400,000 claimed to be due him for services as Receiver and General Manager and for large sums of money advanced by him to the company.

Morristown & Cumberland Gap.—This road was offered at foreclosure sale at Knoxville, Tenn., last week, but was not sold. The minimum price put on the property by the court was \$125,000. The road was originally bonded for \$1,000,000. It is 42 miles in length, extending from Morristown, where it connects with the Southern Railway, to Corrytown, where it connects with the Knoxville, Cumberland Gap & Louisville road.

Ogdensburg & Lake Champlain.—The committee of the first consolidated mortgage bondholders, of which Charles Parsons is chairman, has issued a circular containing a plan for the protection of the interests they represent. Default on the interest of consolidated bonds occurred April 1, 1896, in consequence of the Consolidated Railroad of Vermont receivership. The receivers of this property met the July interest payments of the lessee, but allowed the Ogdensburg interest to remain in default. The committee now proposes to foreclose and form a new company, with a view of including the Lamoille Valley extension, in order to form an independent connection with the Boston & Maine.

Southern.—Following is the statement of earnings and expenses of the company for the month of July, 1896 and 1895:

	1896.	1895.	Inc. or dec.
Month of July:			
Mileage.....	4,752	4,588	I. 164
Gross earn.....	\$1,125,675	\$1,500,901	D. \$375,226
Exp. and taxes.....	1,093,799	1,118,427	D. 24,628
Net earn.....	\$327,876	\$382,474	D. \$54,598
Per cent. exp. to earn ..	76.97	76.52

Texas Western.—The case of the state of Texas against the Texas Western, in which the state is seeking a forfeiture of the charter on account of failure to maintain the property in condition for the safe operation of traffic, has been, on motion of the attorney general, continued to the next term of the District Court. The case has been on the docket nearly three years. The road runs from Houston to Sealy and was paralleled by the Houston extension of the Missouri, Kansas & Texas.

Electric Railroad News.

Baltimore, Md.—The Shore Line Electric Railway Co. has given a mortgage on its property and equipment to the Baltimore Trust & Guarantee Co. to secure bonds to the amount of \$200,000. The road extends from Baltimore to Westport and thence to a point on the Fish House road near Meeter's Spring Gardens.

Buffalo, N. Y.—The gross receipts of the Buffalo Railway Co. and the Crosstown Railway Co. for the year ending June 30, 1896, are as follows:

Buffalo Railway Co.....	\$1,377,457
Crosstown Street Railway Co.....	447,062
Total receipts.....	\$1,824,519

The reports for the year ending June 30, 1895, were as follows:

Buffalo Railway Co.....	\$1,281,587
Crosstown Street Railway Co.....	303,015
Total receipts.....	\$1,584,602

This shows an increase of \$239,946 in the receipts for the last year as against the year preceding. The companies, in accordance with an agreement that was entered into with the city in 1892, pay to the city 2½ per cent of the gross receipts when they aggregate over \$1,500,000. This year the city will receive from them \$45,613.73. It is calculated that there were 4,798,956 more passengers carried this year than last.

Dover, N. H.—The Union Street Railway Co. has sold its road from Dover to Somersworth, at public auction, to Sumner E. Wallace, of Rochester, for \$105,000. A receiver was appointed in 1894. The operating expenses of the road for the year ending June 30, 1894, were 89 per cent, of the total receipts, and for the year ending June 30, 1895, were 85 per cent. The capital stock of the road was \$150,000.

West Roxbury, Mass.—The West Roxbury & Roslindale Street Railroad Co. has petitioned for an increase of capital stock of \$50,000, and for an issue of bonds to the amount of \$150,000 for the purpose of building and equipping its road.

TRAFFIC.

Traffic Notes.

The Cleveland, Cincinnati, Chicago & St. Louis is carrying 15 cars of peaches daily, by a special train, from Benton Harbor, Mich., to Louisville and Cincinnati.

The proprietors of the grain elevators at Superior, Wis., have reached an agreement with the state authorities, and will, after a time, adopt the Wisconsin inspection rules.

The reduction of the rate on corn from the West to the Atlantic seaboard to the basis of 15 cents per 100 lbs., Chicago to New York, is said to have produced a heavy movement. An officer of one of the trunk lines says that when this reduction was made, July 15, fully three-fourths of the corn raised in 1895 was still in the cribs.

In a suit against the Georgia, Southern & Florida for alleged illegal overcharges on freight, Judge Lumpkin has decided, at Atlanta, that Mr. Stone, General Freight Agent of the road, who refused to show records, on the ground that the evidence would tend to criminate himself, is, under the Georgia law, justified in his refusal.

The arbitrators of the Joint Traffic Association will meet on Sept. 15 to consider passenger rates from New York to Buffalo, Niagara Falls and Chicago. The

arrangement of differentials in June, 1895, which was based on the speed of trains, has not worked smoothly. It is understood that the Lehigh Valley is the principal complainant.

On Aug. 30, the Cleveland, Cincinnati, Chicago & St. Louis will put on a new train, the "White City Special" from Cincinnati. It will leave Cincinnati at 1 p. m. and arrive in Chicago at 9. This is the fastest regular run ever made between the two cities. Returning, the train will be known as the Cincinnati and Washington Special, leaving Chicago at 1 p. m. and arriving at Cincinnati at 9:05 p. m. The trains will be new throughout, vestibuled and elegantly furnished.

The railroads carrying anthracite coal from the mines to New York and Philadelphia have increased the freight rates five cents a ton and the rates to Buffalo and Niagara Falls have been increased 25 cents a ton. One statement is to the effect that the Delaware, Lackawanna & Western will increase its tide-water rate 15 cents. The reductions by the other companies do not take effect until September 7, by which time, doubtless, all of the competing lines will agree upon a uniform reduction.

The rate war between the rival boat lines running from Baltimore to Norfolk and Richmond continues notwithstanding the suspension of hostilities by the rival companies so far as railroad rates are concerned. On Saturday last the York River (Southern Railway) line reduced passenger rates to meet the previous reduction of the Bay Line, making the passenger rate from Baltimore to Richmond \$1 and the freight rate (first class) 10 cents per 100 lbs., each of these rates being about 60 per cent. less than old prices. Rates to Newport News and Norfolk are on the same basis, or lower, one statement being to the effect that freight to Norfolk would be taken at five cents per 100 lbs. Judge Simonon has heard the arguments on the petition for a permanent injunction against the reduction of railroad rates, but his decision has not, at this writing, appeared.

The Erie road has announced that it will not follow the recommendation of the Board of Managers of the Joint Traffic Association with regard to the minimum weight of carload lots. The managers recommended that where a road had not cars of sufficient capacity to accommodate shipments of the minimum carload weight two cars might be used and charged for as though for one large one. The New York, New Haven & Hartford has issued a similar notice. The ruling was elicited by the action of the Baltimore & Ohio some time ago. That road, not having a supply of large freight cars, and being thus unable to compete with some other lines, was allowing shippers the use of two cars and charging for one large car. Other roads took exception to this method of doing business, and after several conferences the Board of Managers sanctioned the use of two smaller cars. Roads with plenty of large cars object to the ruling, for the use of two cars opens the way to irregularities.

Chicago Traffic Matters.

CHICAGO, Aug. 26, 1896.

Rate-cutting has been the principal topic in railroad circles of this city during the past week. Chicago-St. Paul rates have about gone to pieces, and rates on packing-house products between the Missouri River and the Mississippi have been reduced more than 50 per cent.

The Lake Michigan Car Ferry Transportation Company and the Lake Michigan & Lake Superior Transportation Company have fallen out, and there have been heavy reductions in rates by the lake lines, followed in part by the all-rail lines. When a truce between the all-rail lines and the Car Ferry was patched up some three months ago the latter was allowed differentials of from 1½ to 5 cents. To prevent undue competition of the Lake Michigan & Lake Superior line the Car Ferry Company allowed that line a differential below its own rates ranging from 1½ cents to 3 cents. The two lake lines worked in harmony. The Car Ferry, dissatisfied with its agreement with the all-rail lines, reduced its rates when that agreement had expired; but the Lake Superior company last week, without notice, jumped the truce, and issued a tariff based on 40 cents first-class, Chicago to St. Paul. The lower classes under this tariff were 10 cents. The Car Ferry promptly reduced its rates to the same basis. The railroads were staggered, but on Saturday it was agreed the lake lines' competition should be met, but only on carload lots. There is now, therefore, a rate of 10 cents on the lower classes in carload lots, in effect to-day. Working under a 5-cent differential the Car Ferry Company was unable to do much business. The all-rail lines believe the fight must be made some time and that now, when very little freight is moving, is the best season. By reducing rates only on carloads, knowing the lake lines get very little higher-class freight, their business will suffer the minimum damage.

Packing-house product rates are going down on account of the competition of the lines to the Gulf of Mexico, and canned meats are now carried from Missouri River points to New Orleans at about one-half the former rates and these goods go there in spite of the hot weather; so the rates eastward have been radically reduced. Five cents has been taken off the 18-cent rate on lard, etc., and 10 cents off the 18½-cent rate on canned meats; but the bulk of the business continues to move to the Gulf. If the old route to the Atlantic seaboard, via Chicago, is to be saved, not only for packing-house products but grain as well, Eastern roads must make reductions from Chicago to New York and Philadelphia. The effect of gulf competition on the grain traffic is shown by a recent statement which makes New Orleans the leading shipping port for export grain during the first seven months of the year, with Baltimore second and New York third. Western roads are carrying grain from the Missouri River to Chicago on a 9-cent flat rate and it is coming here in very large quantities.

Lake lines continue to get the bulk of the eastbound business, handling, last week, 143,202 tons. The amount by the all-rail lines was 58,505. Following is shown the amount taken by each road for last week and the preceding week:

Roads.	WEEK TO AUG. 22.		WEEK TO AUG. 15.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central.....	6,136	10.5	5,887	11.5
Wabash.....	6,634	11.4	4,688	9.2
L. S. & M. S.....	5,921	10.1	6,009	11.8
Pitts., Ft. Wayne & Chicago	7,160	12.2	7,180	14.8
Baltimore & Ohio.....	7,219	12.3	5,255	10.3
Pitts., Cin., Chi. & St. Louis	5,521	9.4	5,412	10.6
Grand Trunk.....	5,356	9.2	4,267	8.4
N. Y. C. & St. L.....	6,245	10.7	5,919	11.6
Erie.....	4,854	8.3	4,929	9.6
C., C. & St. Louis.....	3,459	5.9	1,497	2.9
Totals.....	58,505	100.0	49,044	100.0